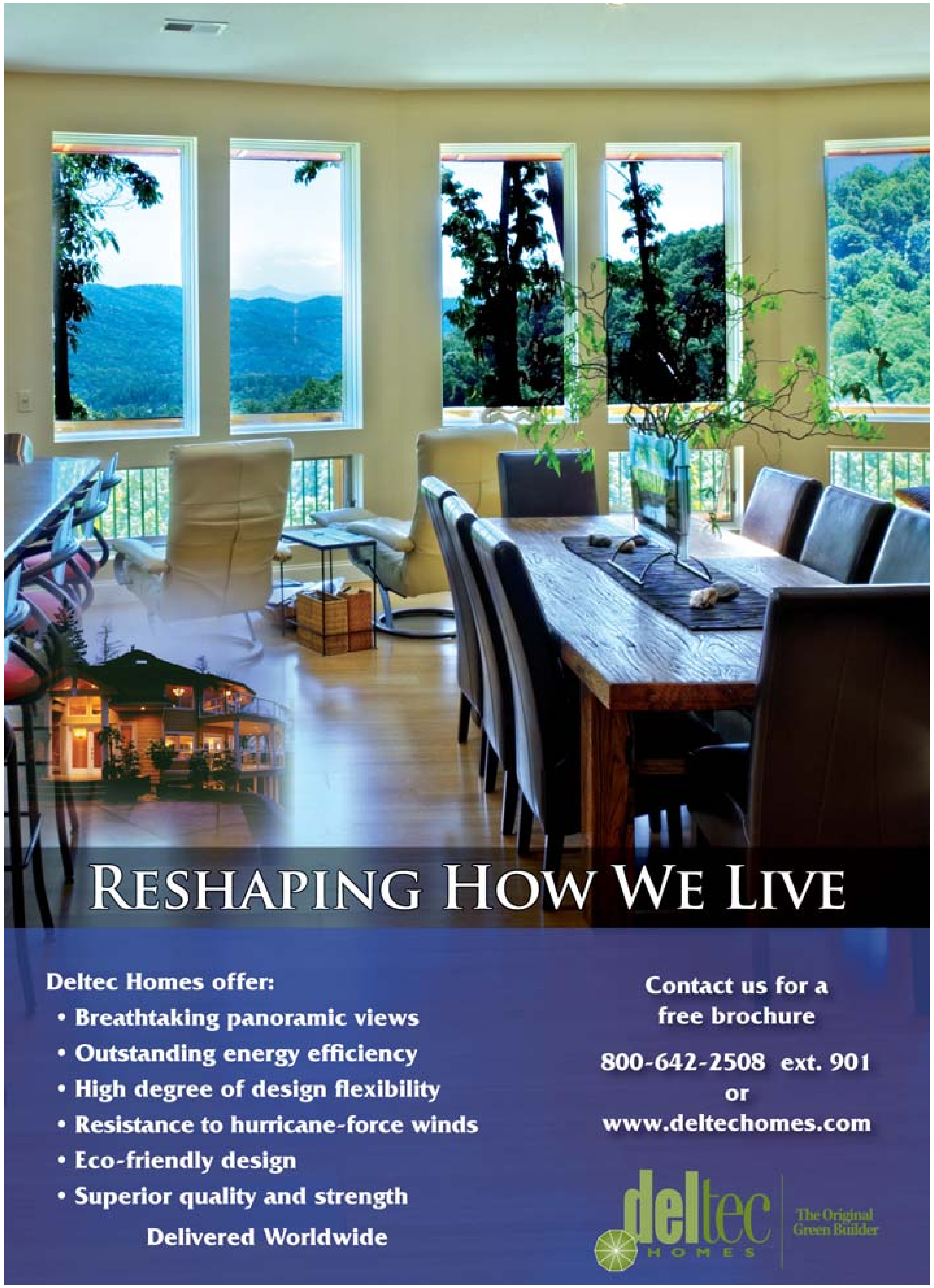

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VOLUME 3, NUMBER 1, ISSUE 13
January/February 2008

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Editor-In-Chief & Publisher
Gary Reber

Executive Publisher
Marlene Reber

Editorial Directors:
Wolfgang Preiser, Ph.D.
Universal Design
Demian Martin
Electronic Lifestyles
Rob Scheschareg
Electronic Home Healthcare
Bill Wilson
Environmental Design
Ann V. Edminster, M.Arch
LEED Design
Jay Hall, Ph.D.
LEED Design
Julie Stewart-Pollack, ASID, IDEC
Biophilic Design

Contributing Writers:
Jill Abelson
William Gauley
Benjamin H. Grumbles
Mark Johnson
Richard H. Karney
John Koeller

Staff:
David DelGrosso
Director Of Marketing/Products Editor
Nathanael Fowler
Art Director
Tricia Spears
Editor
Jack Kelley
Editor

Subscription/Production
Missy Matula, Subscriptions Manager
27645 Commerce Center Drive
Temecula, CA 92590 / 888 977 7827
Phone 951 676 4914 / Fax 951 693 2960
Subscriptions@UltimateHomeDesign.com

UHDPublications.com STORE
Contact: Missy Matula, Customer Service
subscriptions@UltimateHomeDesign.com

MISSION STATEMENT

The mission of *Ultimate Home Design* is to serve as a catalyst for homeowners to create demand for architects, designers, and builders to adopt the concepts and building practices that define human-centered, optimum-performance home design. *Ultimate Home Design* is aimed at broadening the segment of the American population that is paying closer attention to the products they buy, looking beyond price and branding to focus on other elements of the production and value chain. Increasingly homeowners want to support sustainable building practices that result in a higher living standard. *Ultimate Home Design* is for those homeowners who want to promote a broader shift in patterns of production and consumption by encouraging practices that better reflect their personal values. We are advocates for using products that reduce energy and use renewable, recycled content or otherwise environmentally preferable materials. An important part of our mission is to promote building practices that result in a substantial reduction in energy use for space conditioning, water heating, lighting, and appliance operation. Another important aspect of our mission is to promote construction practices that improve the indoor environment and reduce the risk of building-related illness. This translates to improved occupant health and comfort by improving thermal comfort; natural lighting and electric illumination; and controlling humidity, odor, noise, and vibration.

Ultimate Home Design is for the thinking homeowner, who wants to be educated and learn about intelligent options for home design, whole-house system design, and comprehensive electronic lifestyle features that can enrich the quality of day-to-day life while reducing the cost of operating a home. With the knowledge gained reading *Ultimate Home Design*, you will be empowered to make intelligent choices about the design and make-up of your home, whether considering remodels or additions, planning a new home, or evaluating an already-built home. *Ultimate Home Design* will explore the wide range of possibilities within the context of designing Optimum Performance Homes™ that integrate universal design architecture; sustainable green building materials and techniques; energy-efficient power systems for electricity, lighting, heating, and air conditioning; water conservation techniques; and comprehensive electronic lifestyle features.

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"Green" Is Definitely The Theme

Over the course of 2007, I participated in several conferences and expos, which either were themed "green building" or contained a component emphasizing "green building." The term, which has traditionally characterized energy-efficient building, has taken on a new, expanded meaning to include the use of sustainable materials and construction practices, healthy home interior environments, the embodied energy impact of building materials, life cycle costs of buildings, and the end-of-life recycling of used materials for use in new construction (or reconstruction).

As such, this "green sustainable" movement is impacting the construction industry and creating the necessity for architects, designers, developers, builders, contractors ,and homeowners to become educated about "green and sustainable" building products and practices. Such education has been the core mission of *Ultimate Home Design*, to share with our readers knowledge that will allow them to better understand what their options are when it comes to engaging in their own projects.

In addition, we continually acknowledge the efforts of a growing cadre of organizations that certify "green and sustainable" products and homes that have been built to their respective high-performance guidelines. Such new certification programs as ENERGY STAR® Home, which certifies energy-efficient homes, and the launch of the U.S. Green Building Council's Leadership In Energy & Environmental Design (LEED®) for Homes program raise the bar for building performance. The NAHB's National Green Building Program will launch in February an online clearinghouse for learning about state and local green building programs and a new Certified Green Professional designation. Another source of information to seek out is the *GreenSpec Directory* and the excellent selection of books offered by New Society Publishers, which are available through *Ultimate Home Design's* Web site.

In this issue of *Ultimate Home Design*, we are setting out to publish articles on the construction phase of the first Optimum Performance Home®, which is now under construction at The Sea Ranch, California. This in-depth article series will provide comprehensive insight into what's involved in building your own "green" and sustainable, and "biophilic" and "universal" designed home. There is no other media source that provides the level of education that this series does, which delves into the science of optimum performance "green" building and the application of products and practices from which to learn and become inspired. The documentation of the building of this home will also be facilitated with high-definition images and streaming movies accessible through the Web site. At the conclusion of construction a high-definition television documentary will be produced, along with a disc that will offer a greater learning experience.

Appropriately, a focus of this issue is "green building."

There are also many other interesting and informative articles featured in the issue, including:

The U.S. Green Building Council launched its member-approved version of the LEED® For Homes Rating System for nationwide use after a two-year pilot in 12 regions, and Ann Edminster goes into this in detail in her article starting on Page 32.

Ultimate Home Design's David DelGrosso shares his thoughts and feelings on this year's Greenbuild International Conference and Expo in Chicago. Who knew that the windy city was so "green?"

And for a little "Breath Of Fresh Air," Henning Bloech discusses indoor air quality and its affect on the public. The GREENGUARD Environmental Institute is an industry-independent, non-profit organization founded to establish indoor air quality standards and to help improve public health and quality of life, and in this article you will learn more about this group and its efforts.

Linda Mason Hunter teaches us how to "Build A Healthy Home," and who among us isn't interested in that?

Wolfgang F.E. Preiser takes us through one couple's universally designed home and focuses on the "Design Features Of An Ultimate Home."

And Heather Sturgill talks about "universal design," what it is, and why it should be taken seriously.

Thank you for your support. This year should be remarkable with our coverage of the Optimum Performance Home. UHD

For more information on this advertiser, circle 05

New
to the neighborhood

David DelGrosso

Solatube, a leading manufacturer and marketer of Tubular Daylighting Devices (TDDs), has introduced the first-ever line of designer daylighting options. The Solatube Designer Touches line provides new options for homeowners looking for stylish lighting options for their homes and for designers integrating daylighting into their projects.

Choose your trim color to match or accent room décor, then pick a diffuser and lens for the perfect lighting effect in any area. You also have the option of adding more function to your daylighting system with a Ventilation Add-On Kit, a Light Add-On Kit, or even a Daylight Dimmer™. For more information, visit www.solatube.com.

Developed with their newest and most advanced combustion technology, which ensures optimal and efficient burning of firewood, the **RAIS Mino II** is a distinctive yet highly functional stove that illuminates the "Art of Fire."

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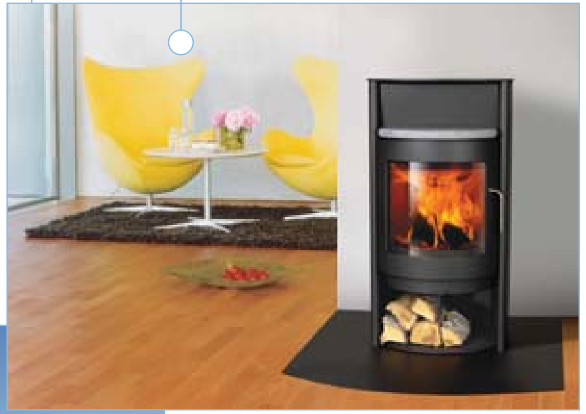
For more information: www.rais.com.



Each year thousands of children and seniors are severely injured by scalding tap water. In fact, tap water scalds are the second most common cause of severe burn injuries among people of all ages. But now a new product line from American Valve called **HotStop** Scald Prevention Faucets, Tub Spouts, and Showerheads are aiming to decrease those numbers worldwide.

When hot water reaches an unsafe temperature, HotStop quickly reduces the water flow to a trickle to avoid scalding. Once the water in the line cools, the flow restarts automatically—usually in less than 30 seconds. And these showerheads and tub spouts install in minutes and require no special tools or plumbing expertise. For more information: www.h2otstop.com.

Arch Treatment Technologies has introduced Wolmanized® L3 Outdoor® Wood, the first decking product protected by a nonmetallic solution. The treating formulation has low impact throughout its production, distribution, and installation, but is very effective as a preservative.

By itself, the preservative would leave wood its natural color. However, to resemble familiar types of treated wood, pigment can be added to the treating solution, giving the wood a light greenish hue. And it has a built-in water repellent, is protected by an EPA-registered formulation that penetrates a wide range of wood species, and is comparable to untreated wood with regard to corrosion of metal hardware. For more information: www.wolmanizedwood.com.

Xantech is now packaging Energy Efficient Regulated Power Supplies with all of the company's IR Kits. These ERGPS energy-efficient power supplies are every bit as reliable and robust as their previous power supplies, but in addition will reduce electricity costs and benefit the environment with lower energy consumption.

The power supply is also packaged into a smaller form. This allows easier installation onto crowded power strips. Another new feature is a secure-fit plug that interfaces with all Xantech IR connecting blocks. A small indentation on the secure-fit plugs allows a tight and secure connection every time. This will reduce accidental disconnection, which can result in installation headaches and service calls. For more information: www.xantech.com.

PF WaterWorks has developed PermaFLOW™—the "World's First Self-Cleaning GREEN Drain System." This P-Trap replacement utilizes a patented SELFClean™ feature that creates flow turbulence, minimizes deposition, breaks and propels debris, and cleans itself, thereby not allowing sinks to get clogged.

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For more information: www.pfwaterworks.com.

For more than 100 years, the roofing industry has been defined by unsafe, landfill-cluttering, energy-inefficient products like asphalt, metal, wood, clay, and concrete. But now **ArmorLite™** has developed roofing material that is 100 percent recyclable and yields zero percent waste in manufacturing.

And from a cost-saving viewpoint, ArmorLite's material reflects heat back into the atmosphere and provides effective insulation, which dramatically reduces homeowners' and building owners' heating and cooling costs. It also saves homeowners money because the material—made from highly engineered polymers—is immune to rotting and mildew. For more information: www.armorliteroofing.com.

SHER-WOOD® KemVar® Glazes are easy to use, HAPS-compliant alkyd glazes—with the versatility of traditional glazes, plus the durability required for use with catalyzed coatings. They are ideal for coloring and accenting the details of cabinetry and other interior woodworking, as part of a complete SHER-WOOD finishing system.

Ready to use and easily applied by brush or spray, SHER-WOOD KemVar Glazes are available in Van Dyke Brown, Natural, and White, and they also can be tinted to create custom colors. Formulated for excellent adhesion between coats and even over unsanded pigmented basecoats, these glazes highlight the wood's grain to create beautiful, three-dimensional looks, with rich depth and color For more information: www.sherwin-williams.com.

The First Optimum Performance Home®

breaking ground plus courtyard experience part XIII

Gary Reber

Architectural Illustration By Ronald Deveza

synopsis

- "Green" sustainable building projects are quite different than traditional construction projects with new materials, processes, unique costs, and much more time and resources utilized in the planning process.
- At the outset of the design of the first Optimum Performance Home, due consideration was given to incorporating building materials, systems, and assemblies used in the exterior and interior design and construction of the home that would mitigate fire risk, and as it turns out, the Optimum Performance Home will be in full compliance with the new California building codes, and in fact, exceed those provisions with attention to fire-risk mitigation in the interior of the home.
- In this issue, the focus will be on the design of the courtyard in terms of the outdoor "room" experience contributed by the Dimension One Spas® Amoré Bay spa, the Finnleo® Finish Sauna, the Rais & Wittus Firebird Outdoor Fireplace/Grille, the Kohler® BodySpa Ten-Jet Tower Shower, the Runco Outdoor Weatherproof High-Definition LCD Display, and the KitchenAid® Outdoor Kitchen.

Introduction

After five years of design and plan development work, the first Optimum Performance Home® is now under construction.

This is the thirteenth article in the series documenting the design and construction of the first Optimum Performance Home. The project has been selected by the U.S. Green Building Council (USGBC) for inclusion in the national Leadership In Energy & Environmental Design (LEED®) for Homes pilot program, their new green build certification initiative, and the goal is Platinum certification.

The home is being built at The Sea Ranch, located in Sonoma County, along the Northern California coastline of the Pacific Ocean, approximately 110 miles north of San Francisco.

The showcase project is exemplary of the "Ultimate Home Design®" concept, which integrates age-friendly universal design with the best sustainable building practices, while exerting minimal impact on the natural environment. Universal design is the inclusive, non-discriminatory design of products, buildings, environments, and urban infrastructure; as well as information technologies that are accessible to and useable by (almost) all. With respect to home design, the idea is to design and build homes that have no physical barriers, thus sustaining people of all ages and all capabilities in a functional, comfortable, and aesthetic lifestyle.

A building-science systems approach to home building is the cornerstone of the project, with emphasis on the relationship between the home's components and the envelope they

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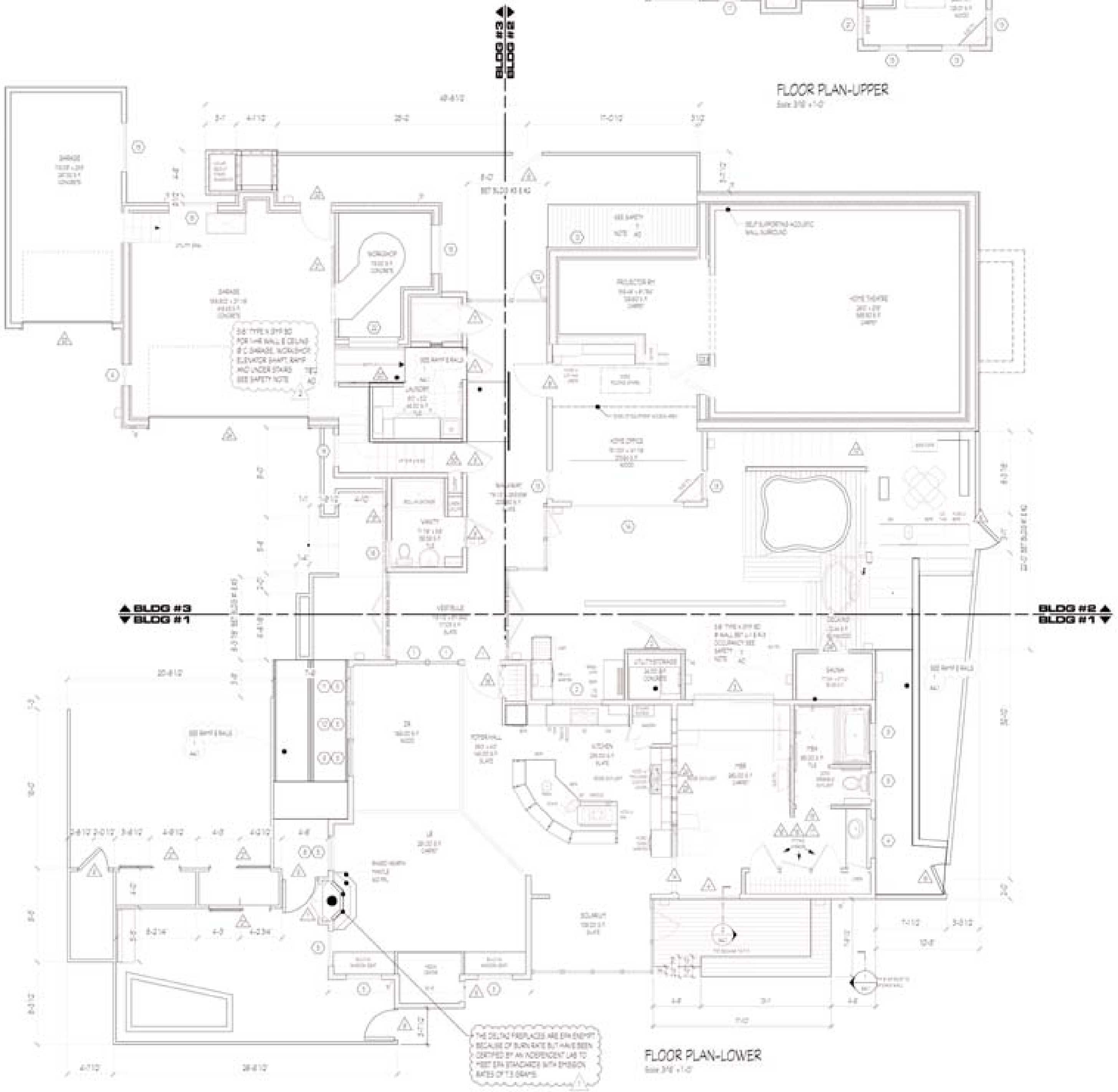
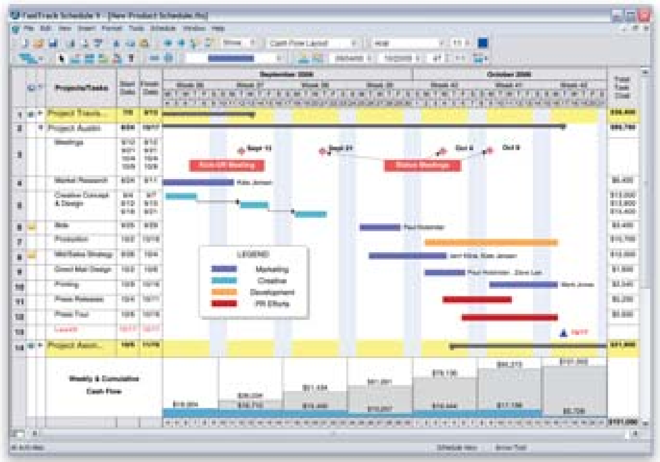
The First Optimum Performance Home® At The Sea Ranch





FastTrack Schedule 9.2

create. Also paramount is good stewardship—proper regard and respect for the rights of neighboring homeowners and the surrounding natural setting, and resource efficiency. The goal is to optimize occupant health, comfort, and safety; maximize energy efficiency and structural durability; and minimize environmental impact. In addition, the aim is toward providing a nurturing home environment to support independent living and sustainable lifestyles.

Part I of this case study series appeared in Issue 1, January/February 2006. The introductory article covered the project scope. Thereafter, each issue has contained a part of the continuing series by working through site planning and preparation; Low-Impact Development (LID); further refinements to the site plan and drainage design; The Sea Ranch Design Committee-approved architectural/structural and grading/drainage submittals with conditions that translated to clarifications on certain building components and material finishes; particular aspects of the home's mechanical plan; structural aspects of foundations, structural walls incorporating Insulating Concrete Forms (ICFs) and Structural Insulated Panels (SIPs), as well as roofing; the acoustical design of the dedicated Optimum Performance Home Theatre™ and rear-projection room; interior design approaches and materials; kitchen, bath, and home fixtures; universal design architecture; fire risk mitigation; and energy generation.

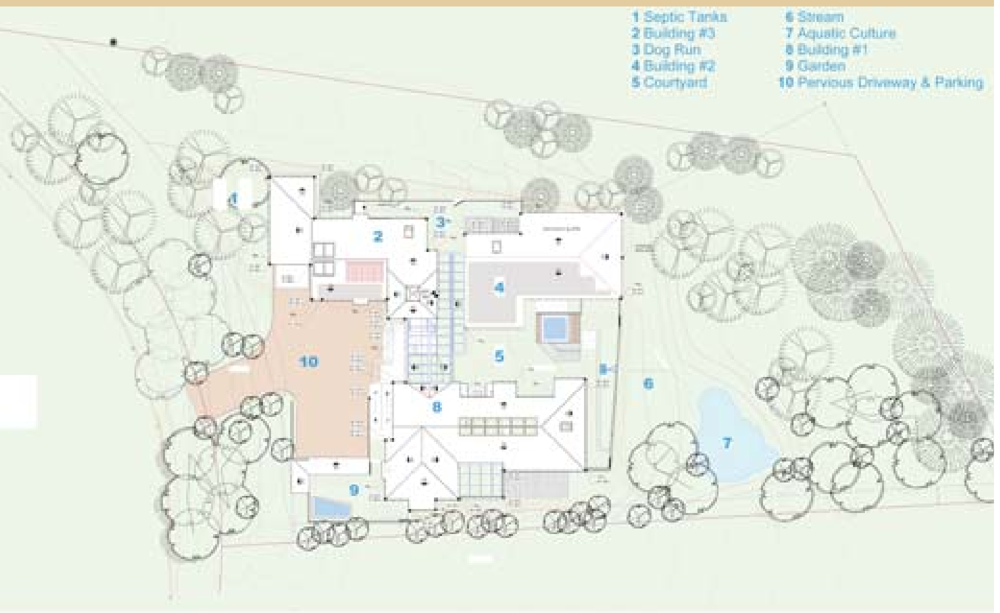
A Final Approval letter for The Sea Ranch Association Construction Performance Permit was issued on October 11, 2006, which is required by Sonoma County prior to obtaining a county building permit. The Sea Ranch "Approved For Construction" permit was issued on October 11, 2007 following the approval of final construction plans by the Sonoma County Building Department. Six permits have been issued: site plan, landscape plan, septic system, geothermal boreholes, grading, and building. Commencement of construction with initial site grading, foundation, and mechanical infrastructure is now underway. Completion of the home is anticipated for November 2008. It is our intent to stage a full-on presentation at the November 19 to 21, 2008 U.S. Green Building Council's Greenbuild International Conference and Expo in Boston. Our presentation will reveal the step-by-step process for creating our first Optimum Performance Home—expected to be one of the highest rated, if not the highest, LEED for Homes Platinum residential home in the world!

FastTrack Scheduling

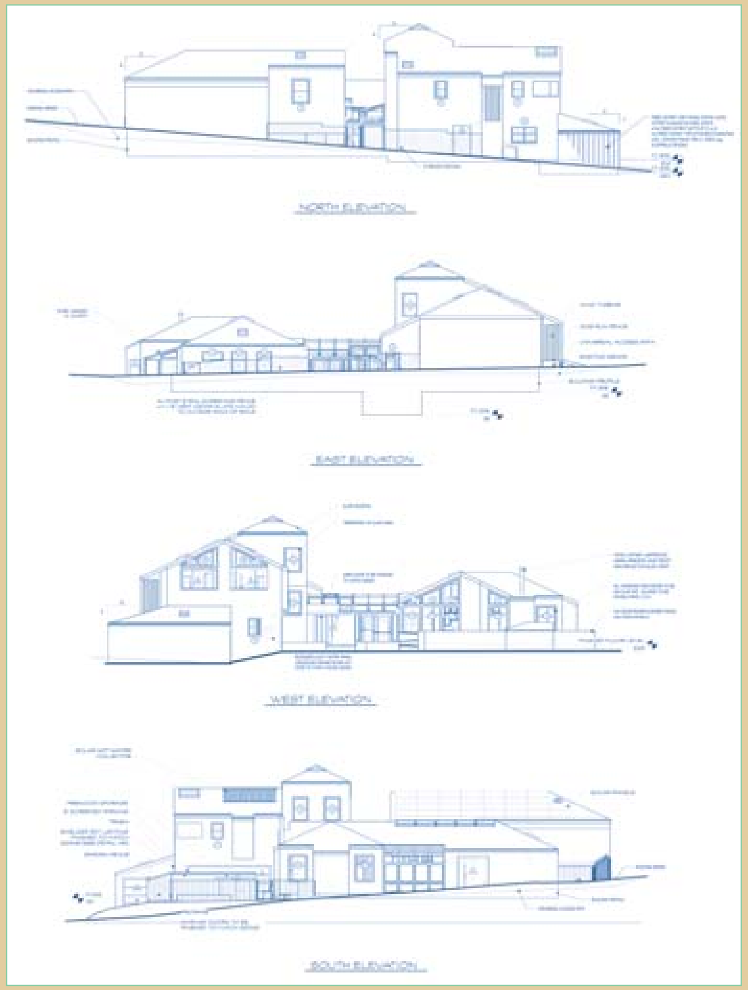
An integral part of the planning for the construction timetable is mapping out the construction time period using AEC Software's FastTrack Schedule® 9.2, the company's flagship project management (PM) software for both Microsoft® Windows® and Apple® Mac® OS X (our preferred format) environments, including Microsoft Windows® Vista® and Macintosh OS X v10.4 Tiger platform. FastTrack Schedule 9.2 is an easy-to-use, cross-platform project-management solution that enables builders, developers, architects, and contractors to effectively plan, estimate schedules, track, and communicate project objectives. FastTrack project information fully integrates with Microsoft Project® (.mpp) files.

FastTrack Schedule 9.2 allows our project team to know exactly which suppliers are involved in each stage of the project, and the schedule shows them precisely when the materials will be delivered. Predefined columns track dates, durations, resources, costs, calculations, ID codes, work categories, and more. FastTrack Schedule 9.2 also tracks changes to the timeline for task starts and completions, allowing for site and work flow flexibility planning, and project change orders. Scheduled, revised, and actual dates/durations make it easy to track activity progress. Thus, our project team is able to track and understand the scheduling and cost impacts of the different changes that

"'Green' sustainable building projects are quite different than traditional construction projects with new materials, processes, unique costs, and much more time and resources utilized in the planning process."



LANDSCAPE/SITE PLAN



The elevations of the Optimum Performance Home at The Sea Ranch

are made throughout the construction project. In this way, we are able to create charts showing the progress of the construction, which helps to stay on schedule. For example, we are able to give a schedule to each subcontractor showing when they are expected to complete their work. This allows subcontractors to understand the "bigger picture" and the importance of staying on schedule and within budget.

This is all accomplished with FastTrack Schedule 9.2 using color, fonts, patterns, outlines, images, and notes to simplify the intricate details of the construction project for our team to understand. The colorful presentation-quality schedules clearly communicate project status and goals to our team. And with support for iCalendar/iCal (.ics) files, scheduling can be published in this standard calendar format for team members to view through a Web browser, as well as the program's standard Calendar View. FastTrack Schedule 9.2 serves as an important educational tool for both the construction team and myself, as the project leader. The program provides tremendous flexibility to select and format information needed by each member of our team. It provides an intelligent framework for our team to discuss progress and the options and impacts of alternatives that every construction project is faced with. As such, FastTrack Schedule 9.2 is a fantastic tool to enable our team to better plan, present, manage, and complete the first Optimum Performance Home project on time and within budget. Using the program's schedule-building tools, FastTrack Schedule 9.2 is helping us to more efficiently meet the specific Platinum-certification LEED for Homes requirements. This is an important feature of the program, as "green" sustainable building projects are quite different than traditional construction projects. There are new materials, processes, unique costs, and much more time and resources utilized in the planning process.

To learn more about FastTrack Schedule 9.2, visit www.FastTrackSchedule.com.

Below is the breakdown of the initial site preparation and grading process and foundation work. This will be discussed in-depth in Part XIV, and an outline will be provided for the next stage of construction consisting of the Amvic ICF (Insulating Concrete Form) and ThermaSAVE SIP (Structural Insulated Panel) walls and roofing.

Pre-Construction Start Meetings

Site Work
- Temporary Electrical Power
- Install iBeam Systems Time-Lapse Pro Construction Camera
- Activate Water Service
- Clear Lot Vegetation
- Lay Out House Pad
- Excavate Optimum Performance Home Theatre, Alcove, Wine Cellar
- Lay Out Footings
- Dig Foundation Footings And Install French Drain
- Set Forms, Tie Rebar Steel, Hold Downs And Anchor Bolts
- Form Underground ICF Home Theatre, Alcove, And Wine Cellar Walls
- Prepare For In-Floor D-Box™ Technologies Custom Motion Platform In Home Theatre
- Verify Foundations' Site Placement/Inspection
- Dig Large Pond, Septic And Cistern Areas
- Place Underground Cistern
- Place Underground Septic Tank
- Drill Geothermal Bore Holes, Place Piping And Grout
- Run Spunstrand HVAC Ducking For Home Theatre

Foundations
- Pour Footings
- Form Foundations With Energy Edge
- Conduit Trenching For Uponor PEX Plumbing
- Run Plumbing Waste
- Install Gravel Around Plumbing
- Run Plumbing Conduit And Supply
- Run Electrical And Low-Voltage Conduit
- Layout Broan Central Vacuum System
- Install Gravel, Vapor Barrier And Sand
- Install Slab Rebar
- Lay Out Uponor Radiant Heat Floor PEX Piping
- Underslab Inspection
- Pour Slab
- Waterproof Home Theatre, Alcove, And Wine Cellar Walls
- Backfill Foundation

The initial site preparation work is being done by Sonoma County Builders, Inc. under the direction of Noble and Loyal Davis. This company, based both in Santa Rosa and Point Arena, California, has had extensive experience in excavation for both residential and commercial/civic projects for over the past 35 years. They are very supportive of the project and sensitive to the environmental concerns and protections that are in place for the project. Prior to the start of their excavation work, the tall grasses were cut down to dirt by Steve Glaze (Steve Glaze Backhoe). This top layer of roots is being stockpiled and allowed to form a "top soil" compost for later spreading back over the site, just prior to landscaping, with indigenous vegetation and trees. John Feeney, our supervising contractor and his team consisting of Jerry Feeney, Brad Estele, and Aaron Phillips will perform the foundation work. Weeks Drilling & Pump Company, based in Sebastopol, California, will drill the five 310-feet-deep geothermal bore holes under the direction of Chris Thompson, CEO. Don Bartlett will install the WaterFurnace geothermal and Spunstrand underground air-conditioning ducking system. Bill Wilson Environmental Planning and Design, LLC with Dylan Coleman, principal in Mt. Shasta, California-based Wonderwater, are responsible for the on-site water-management systems, including the pond, drains, and rainwater cistern catchment.

California's New Building Codes

I have covered extensively in Part XI, September/October 2007 (Issue 11), the fire mitigation provisions in the design of the Optimum Performance Home at The Sea Ranch. California will implement changes to the state's building codes effective January 1, 2008. The changes pertain to building materials as part of a two-prong approach for protecting a building from wildfire. This is critically important to homes located at The Sea Ranch, as this development is designated as being located within a Wildland-Urban Interface Fire Area and the particular site in a Very High Fire Hazard Severity Zone.

The law currently requires that homeowners clear 30 feet and do fuel modification to 100 feet around their buildings to create a defensible space for firefighters to protect their homes.

The new building codes are designed to protect homes from being ignited by flying embers, which can travel as much as a mile away from a wildfire. The new codes require non-combustible or fire ignition-resistant standards designed to prevent embers from igniting a structure. This includes provisions

For more information on this advertiser, circle 07

iBeam® Systems Time-Lapse Pro Camera

• The iBeam® Systems Time-Lapse Pro all-weather on-site construction camera provides the means to build a high-resolution photo archive of the entire project, including stunning 1920 x 1080p (progressive) high-definition time-lapse movies each month.

for decks (www.fire.ca.gov/wildland_content/downloads /decks.pdf), eaves (www.fire.ca.gov/wildland_content/downloads/eaves.pdf), roof coverings (www.fire.ca.gov/wildland_content/downloads/roofs.pdf), walls (www.fire.ca.gov/wildland_content/downloads/walls.pdf), exterior windows (www.fire.ca.gov/wildland_content/downloads/windows.pdf), gutters (www.fire.ca.gov/wildland_content/downloads/gutters.pdf), and exterior vents (www.fire. ca.gov/wildland_content/downloads/vents.pdf).

At the outset of the design of the first Optimum Performance Home, due consideration was given to incorporating building materials, systems, and assemblies used in the exterior and interior design and construction of the home that would mitigate fire risk. Thus, as it turns out, the Optimum Performance Home will be in full compliance with the new California building codes, and in fact, exceed those provisions with attention to fire-risk mitigation in the interior of the home. Thus, the home is designed and is being constructed to resist the intrusion of flame or burning embers projected by a vegetation fire.

iBeam® Systems Time-Lapse Pro Construction Camera

As a further means to document the construction of the first Optimum Performance Home, an iBeam® Systems Time-Lapse Pro all-weather on-site construction camera will be installed and operational throughout the construction period. This will allow us to build a high-resolution photo archive of the entire project, including stunning 1920 x 1080p (progressive) high-definition time-lapse movies each month.

Photos will be captured and automatically uploaded to iBeam's secure server every 15 minutes from 6:00 am to 6:00 pm each day and will be viewable through a link from the *Ultimate Home Design* Web site. Furthermore, the images can be easily e-mailed or printed to document jobsite conditions. This will allow our project team and all those interested in this project to view up-to-date progress on the construction of the home. iBeam will allow our team to stay informed about the flow of work and will keep an organized record of the process, using live jobsite images.

The requirements for the iBeam Time-Lapse Pro are power, an Internet connection, and a suitable location to mount the camera. In our case, the camera will be mounted on a 20-foot power pole and interfaced with WildBlue™ Satellite Speed Internet® provided by the DISH® Network. The time-lapse images and streamed monthly movie will be accessible to everyone by visiting www.ultimatehome-design.com/oph and by signing on with Username: OPHSeaRanch and Password: OPHSeaRanch.

At the conclusion of the project, the entire construction photo archive will be featured as a 1080p high-definition time-lapse movie and will become part of a high-definition television program and educational documentary that my production partner, Steve Michelson of Steve Michelson Productions, and I are producing. Steve owns Lobitos Creek Ranch, a full-service production and postproduction studio located in the coastal hills south of San Francisco, California at Half Moon Bay. They offer a wide variety of services for video and digital media production, including development, co-production, editing, animation, HD optical disc, DVD, Web-enabled DVD, and multimedia design and authoring. With 30 years of experience in producing video, Steve's work includes concerts, documentaries for public television, and communications for non-profits and corporations.

iBeam's other construction cameras are the iBeam OnSite and iBeam Handheld. The OnSite monitors construction activity live, while the Handheld provides a cordless Web cam, which allows live interior and detail construction views of a project.

For more information on iBeam's construction cameras, visit www.ibeam-systems.com.

WildBlue Satellite Speed Internet

In order to facilitate capturing the high-resolution images taken on-site by the iBeam Time-Lapse Pro construction camera, we are using the "always on" WildBlue Satellite Speed Internet system developed by WildBlue Communications, Inc. and offered as part of EcoStar's DISH Network satellite services. The offer is provided separately under the EchoStar brand name, and sub-branded as "powered by WildBlue." The new WildBlue Enterprise Solutions™ satellite services system offers business-class broadband

connectivity via state-of-the-art satellite technology.

WildBlue uses a 26-inch satellite mini-dish equipped with both a transmitter and receiver for two-way satellite connectivity to the Internet. WildBlue service does not require cable or phone lines. The service works with both Microsoft Windows, including Windows Vista; and Apple Macintosh OS X, including v10.4 Tiger; and the iBeam Systems' Time-Lapse Pro construction camera. WildBlue's approach is based on next-generation, two-way wireless Ka-band spot beam satellite technology, which lowers the cost of providing high bandwidth access to the Internet. WildBlue uses industry-standard technology in its consumer premise equipment. The resulting low-cost structure enables an affordably priced high-speed Internet service that is available across the country. The highest currently available speed is the Pro Pak level, which offers download speeds up to 1.5 Mbps and upload speeds up to 256 Kbps. The new WildBlue Enterprise Solutions' satellite service will provide even faster speeds.

The WildBlue 26-inch satellite mini-dish will be installed at site level facing due south.

Once the construction of the Optimum Performance Home is complete, a whole-house high-definition EchoStar DISH Network satellite system with WildBlue Enterprise Solutions service will be installed. As well, a LifeSize Communications LifeSize® Room™ high-definition video communications/conferencing system over an ubiquitous IP network at 1280 x 720 pixels at 30-frames-per-second video resolution will facilitate video conferencing with the magazines' (*Widescreen Review*® and *Ultimate Home Design*) production offices located in Southern California.

WildBlue™ Satellite Speed Internet®

• The "always on" WildBlue™ Satellite Speed Internet® system developed by WildBlue Communications, Inc. and offered as part of EcoStar's DISH® Network satellite services offers business-class broadband connectivity via state-of-the-art satellite technology.

New Resource Bank

As covered in Part XII, November/December 2007 (Issue 12), our initial approved construction loan was lost in early August just before funds were to be issued due to the "mortgage meltdown" and a harrowing global credit crunch, which has severely impacted new construction financing.

New Resource Bank, the nation's first "green" commercial bank, which is located in San Francisco, rescued the project issuing a new construction loan. As a bank that is founded by world-class entrepreneurs and green business experts, New Resource Bank is developing its green building program by drawing on leading experts within the "New Resource Community."

The accompanying sidebar, located at the end of this article, is an interview I conducted with bank founder and Vice Chairman, Peter Liu.

This Issue

In this issue, the focus will be on the design of the courtyard in terms of the outdoor "room" experience contributed by the Dimension One Spas® Amoré Bay spa, the Finnleo® Finish Sauna, the Rais & Wittus Firebird Outdoor Fireplace/Grille, the Kohler® BodySpa Ten-Jet Tower Shower, the Runco Outdoor Weatherproof High-Definition LCD Display, and the KitchenAid® Outdoor Kitchen.

Design Concept

As previously noted in this series, the home design integrates all of the concepts advocated in *Ultimate Home Design*. The goal is to demonstrate how modern building products and methods can make life safer, more comfortable, and more enjoyable. The science of optimum performance homes concerns itself with building structures that use less energy, are quieter and more comfortable, have fewer problems with material degradation, provide clean air and water, and do less damage to the environment. As an integrated and holistic design, the house will serve as a permanent residence that allows its occupants to age in place.

The high-performance building systems to be employed are designed to exceed California building code requirements and resist natural disasters more effectively than a code-minimum house, even with the new California code requirements that require use of non-combustible or fire ignition-resistant building materials. Built with stronger building materials and superior techniques, the home will be safer, allowing homeowners greater peace of mind. The Optimum Performance Home qualifies for the Fortified…For Safer Living® program of the Institute for Business & Home Safety (www.ibhs.org/business_protection). This program specifies construction, design, and landscaping guidelines to increase a new home's resistance to natural disaster.

In addition, the home will meet the guidelines and qualifications for the U.S. Department of Environmental Protection's ENERGY STAR®, the EPA's (Environmental Protection Agency) WaterSense™, and the American Lung Association® Health House® programs. It also will meet the requirements of the National Association of Home Builders' (NAHB) Model Green Home Building Guidelines, the Sustainable Buildings Industry Council (SBIC) Green Building Guidelines, and the "Green Points" program. Sonoma County and The Sea Ranch Association are now considering this program for adoption.

Furthermore, the home's design was the subject of a case study analysis presentation before the Custom Residential Architects Network (CRAN), Full Spectrum Practice Convention of the American Institute of Architects on October 20, 2007 in Chicago, Illinois.

The home is also a case study of the California Energy Commission in terms of energy-efficiency applications and an advanced water-saving plumbing plan.

Finally, the home is a national showcase for CEDIA (Custom Electronic Design and Installation Association), and is the subject of a series of articles on the design and installation of the electronic lifestyle components in the home. These articles are featured in CEDIA's *Electronic Lifestyles®* quarterly magazine.

The Setting

The Sea Ranch is an internationally renowned 5,000-acre environmentally protective residential development situated within a pastoral and forested coastal enclave and nature preserve approximately 110 miles north of San Francisco, California. This stunning development, now celebrating its 43rd anniversary, straddles a ten-mile stretch of Highway 1 along a stretch of uniquely beautiful rugged coastline, ending at the northern tip of Sonoma County and the south bank of the Gualala River.

The Sea Ranch is widely regarded as a unique and remarkable residential development. During the 1960s and 1970s, The Sea Ranch was at the forefront of environmentally responsible development. It was conceived and designed by architects and landscape architects who wanted to provide a harmonious mixture of custom homes and pristine natural Northern California landscape in oceanfront, meadow, and forest environments. In fact, The Sea Ranch concept and its architecture are recognized in schools of architecture around the world, and it is frequently used for case studies in environmental and architectural design. The first condominium complex to be built on the southern coastal bluffs of The Sea Ranch is now a registered national architectural site.

Single-family development occupies approximately 2,500 acres without borderline fences or other visible delineation of property lines. The remaining acres are permanent green-scape commons with 45 miles of nature trails for walkers, bicyclists, and equestrians. Each home is custom designed by an architect/architectural designer following site-specific design guidelines and is situated off a private road network without curbs, sidewalks, or streetlights. The Sea Ranch is a very unique residential development woven into a tapestry of buildings and nature and committed to environmental preservation. The development includes 2,288 lots for single-family custom homes, with 534 remaining to be developed (1,754 already developed and 29 under construction).

Gary And Marlene Reber
Publishers Of "Ultimate Home Design"
Breaking Ground
For The First Optimum Performance Home®

The Sea Ranch is managed by The Sea Ranch Association, a Common Interest Development (CID) with an elected volunteer Board of Directors, and supported by numerous volunteer committees. All development on The Sea Ranch is subject to design review and the approval of a Board-appointed autonomous Design Committee. The Design Committee is presently comprised of architects and landscape architects, though it does not include anyone with experience in vegetation management or "green" sustainable building design. A legal set of Covenants, Conditions, and Restrictions (CC&Rs) govern the development and are designed to protect The Sea Ranch concept.

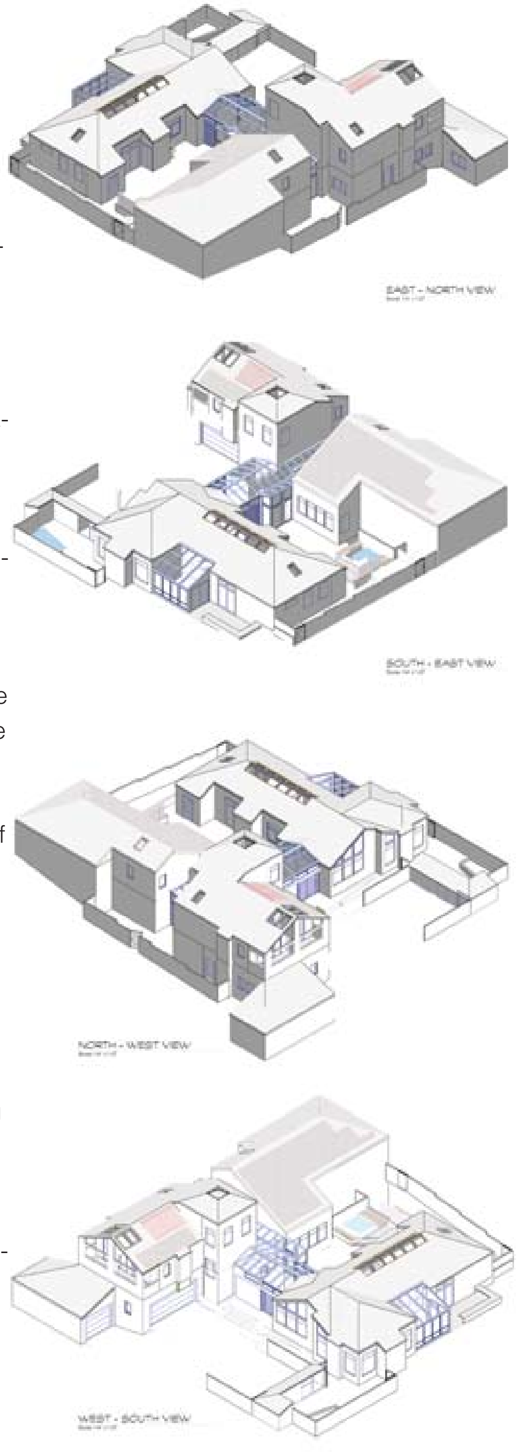
For more information on this advertiser, circle 08

The Home

The Sea Ranch Design Committee imposes upon designers architectural building blocks derived from the original rural structures found on the northern California coast. Designers are expected to apply their creativity to render various arrangements and deviations to arrive at a custom solution that specifically responds to the site. Successful proposals submitted to the Design Committee address the issues of passive solar positioning, wind, glazing (window) layout, privacy between neighbors, vegetation protection, view preservation, topography and grade changes, roof slopes, appropriate exterior materials and finishes, and other exterior design considerations—all within the building and site design.

A focus of the Optimum Performance Home's design is to stand as a showcase for the "green" movement and demonstrate means of reducing a home's impact on the planet through the use of Low-Impact Development (LID) and environmentally responsible and sustainable building materials. It is hoped that the home will become a case study for a "Green Points Program" suited to the scale of The Sea Ranch.

The home's 3,272-square-feet living space (4,441-square-feet total building "footprint," including garages, covered walkways, courtyard, and decks) will be arranged in a three-building compound using a well-sealed, well-insulated, super-tight building envelope that reduces temperature fluctuations and enhances overall energy efficiency. This arrangement provides for an alcove courtyard protected from the prevailing wind from the northwest. The home is designed with differing spatial experiences throughout to encourage exploration. The home will display innovative interior design and be furnished in a contemporary Frank Lloyd Wright style appropriate to its dimensions. The home design connects the indoors and the outdoors with covered walkways, a courtyard, decks, and a garden to expand livable space, without requiring heating or air conditioning. The home is designed in accordance with biophilic design principles with abundant and excellent use of natural light and natural indigenous landscaping planned. (For an in-depth analysis of the biophilic attributes of the home, please read "Biophilic Design," "Biophilic Design Attributes," and "The Interior Design Process, Part I: Synthesizing Sustainability, Universal Design, And Technology" authored by Julie Stewart-Pollack in Issue 3 (May/June 2006), Issue 4 (July/August 2006), and Issue 10 (July/August 2007), respectively.



Four perspective views of the Optimum Performance Home at The Sea Ranch

The main-floor living area is designed to accommodate the capabilities of all occupants without any challenging physical barriers, even for the elderly and disabled. The home design features a ground-level open plan for the living room, dining room, master bedroom suite, and spacious kitchen with solarium, exhibition cooktops, and home management system.

The second building in the compound is designed to accommodate a large state-of-the-art Optimum Performance Home Theatre™ with integrated rear-screen projection room and a home office.

The third building will include a two-car and boat garage, workshop, main-level guest bathroom, and laundry room. The second level of this building will have two guest bedrooms, a bathroom, and a dedicated library/home theatre/surround music room distinguished by a high-tower feature. To insure universal access to this floor, the design provides for an Otis® Gen2 residential elevator.

The entrance and walkways that connect the three buildings and the solarium will be enclosed with insulated- and solar gain-reduced-tempered glass. There will be a seating area at the vestibule entrance to the home. The main entrance vestibule will serve as an oversized mudroom. The driveway, area around the garage, guest parking, and entrance to the home—as well as all paths—are designed in accordance with The Sea Ranch guidelines governing exterior hard-surfaced paths. All such surfaces are pervious to virtually eliminate water runoff. The surface will be packed with decorative gravel to enhance the natural appearance of the home's setting. There also will be a dedicated equipment room off the courtyard, which accommodates the Uponor® and WaterFurnace® radiant-heating apparatus, TrendSetter® solar hot water storage tanks, Microtherm's Seisco® on-demand electric tankless water heater, and other equipment. The backup Kohler® generator is housed within a separate weather-resistant tower located off the north wall of the two-car garage and guest bedroom, within the fenced dog run. This tower is designed to optimize the northwest wind performance of the PacWind® Seahawk® vertical-axis Savarrieus™ wind turbine disguised within (see Part 12, November/December, Issue 12).

The home site is nestled on an almost-acre parcel at the edge of a forested area of the southern section overlooking the Pacific Ocean, offering distant water views. Some of the home's features will include a Benissimo® slate-floor outdoor courtyard, two thick solid hardwood Ipé deck areas, in-ground Dimension One Spa® Amoré Bat hot tub, Finnelo® Finnish sauna, and underground wine cellar. The orientation of the home on the site is designed to take advantage of natural lighting and passive solar heating and cooling. Good site and land planning will result in minimal land disturbance and preservation of natural features and environments.

Landscaping will consist of The Sea Ranch-approved indigenous vegetation with low-water requirements and unique water conservation features, including two ponds and a stream supported by rainwater catchment and captured runoff. Site grading has been specifically planned to enhance the project's placement in the watershed, and the design incorporates the principles of Low Impact Development to minimize runoff from impervious surfaces and mimic the natural hydrology in overall effect. The resultant water harvesting will then minimize the use of irrigation, and the increased infiltration and retention will passively support the native landscape. Additionally, a gray water system will be used for undersurface plant irrigation.

Dimplex® Ventura Ceramic Radiant Heater

• Rather than simply heating the air, the Dimplex® Ventura Ceramic Heater produces infrared energy that provides effective warming at any outside temperature. The Ventura features silent operation with no distracting visible light output.

Dimension One Spas® Amoré Bay

• A Dimension One Spas® Amoré Bay spa will be featured in the courtyard area. The D1 Amoré Bay is the ultimate performance and comfort spa that is renown for energy efficiency and reliability.

The Courtyard

The courtyard is a focal point of the Optimum Performance Home's three-building compound design. The courtyard creates a villa outdoor living space experience, and is designed in accordance with biophilic design principles with abundant and excellent use of natural light and complementing amenities that contribute to the overall life-enhancing experience the home will nurture. There are six aspects to the design of the courtyard that facilitate such an experience.

- Dimension One Spas' Amoré Bay hot tub
- Finnleo Finish sauna
- Rais & Wittus Firebird Outdoor Fireplace/Grille
- Kohler BodySpa Ten-Jet Tower Shower
- Runco Outdoor Weatherproof High-Definition LCD Display
- KitchenAid Outdoor Kitchen

An integral design element of the courtyard are Dimplex® outdoor Ventura Ceramic Radiant Heaters. Rather than simply heating the air, the Radiant Heaters produce infrared energy, which actually heats the objects in front of them. It works much like the natural energy of the sun. The durable Ceramic Radiant Heater has powerful 240-volt ceramic heating elements that provide effective warming at any outside temperature. The Ventura features silent operation with no distracting visible light output. An adjustable mounting bracket lets one target the heating zone. Three Ventura Ceramic Radiant Heaters will be employed in the courtyard.

Dimension One Spas' Amoré Bay

The new Dimension One Spas Amoré Bay hot tub will be featured in the courtyard area. The D1 Bay Collection® Amoré Bay is an ultimate performance and comfort spa that employs D1's renown energy efficiency and reliably.

The Vista, California-based company holds in excess of 30 patents that underscore an eco-savvy mentality. D1 was introduced to the Optimum Performance Home project by Michael Galica, owner of the eco-friendly Marin Outdoor Living showroom in Greenbrae, California. Dimension One's Bob Hallm, CEO and co-founder with his wife, Linda, is committed to constantly innovating new sustainability ideas in D1 spas that are environmentally and ergonomically friendly.

In an age when "green" sustainability is deemed paramount, Dimension One Spas leads the environmental crusade in the home hot tub market by creating products that exemplify sustainable luxury.

Dimension One Spas incorporate such body experience features as:

• **Hydronomics**: D1's extensive study of human anatomy, egonomics, fluid mechanics, aquatic massage, acupressure, and reflexing led them to develop a new field they named "hydronomics"—the study of human energy transfer within an aquatic environment. Using state-of-the-art modeling software, D1 engineers design hot tubs in virtual space, giving them unprecedented control over materials, and thus ensuring the ultimate in comfort.

• **Dynamic Massage Sequencer**: Introduced in 1999, DMS was the world's first programmable hydrotherapy massager. The built-in massager focuses on six specific therapy zones and offers pause and speed controls.

• **Ultralounge:** This "spa-within-a-spa" lounge chair-inspired section of the tub features patented BioForm™ seating in a "no-float" angle design to keep occupants solidly in their seats instead of buoyantly drifting about; sculpted leg contours; and acupressure therapy for wrists and hands. These features provide the ultimate in full-body hydrotherapy.

• **Neck Jet Pillow:** The first and only height-adjustable spa neck jet pillow.

Dimension One Spas incorporate such clean energy features as:

• **EnviroTect™:** The Ultralife slip-resistant interior of each hot tub is surrounded by a durable, all-weather exterior made from 100 percent recycled plastic milk containers. EnviroTect is the most environmentally-friendly exterior available for spas today. This 100 percent recycled material is environmentally stable (HDPE); does not give off any harmful fumes; and is highly recommended by the Healthy Building Network, a national organization of green building professionals and environmental health activists. EnviroTect requires virtually no maintenance and unlike wood, the all-weather EnviroTect requires no staining or painting. EnviroTech is exceptionally resistant to moisture, fading, insects, splintering, warping, and other hazards of environmental exposure.

• **Vision® System Cartridge:** The Vision System provides a natural clean-water alternative to harsh, chemical-based filter systems. The Vision Cartridge uses silver catalyst technology to kill 99.96 percent of bacteria on contact. The cartridge lasts up to six months, significantly reducing chemical maintenance.

• **Water-Management Technology**: D1 water-management technology cuts down the need for chlorine in the spa water from three to five parts per million to 1 ppm, which means no more dry, itchy skin, faded swimwear, irritated eyes, or strong odors from chlorine.

• **UltraPure® *Plus*™ Water Management System:** D1 Amoré Bay spa features the UltraPure *Plus* Water Management System, the most sophisticated water-management system in the industry. The five-step filtration system purifies the spa water 24/7 and includes the smart use of an ozonator, an ultraviolet (UV) germicidal light, zinc and silver minerals, chlorine (to totally eliminate surface bacteria), and a filter. D1's patented system provides the cleanest, clearest spa water in the industry. Without this balanced, carefully engineered system more chemicals and maintenance time would be required, and the water would still not look as clean and clear.

The UltraPure system uses low-power, 98-watt circulation pumps to purify the tub's water. Eighty-four percent of the power that UltraPure uses is returned back to the water as heat.

The water source will be filtered rainwater harvested off the Evergreen slate roofs (see Part VI, November/December 2006, Issue 6).

• **Fast Flo Heater:** D1 spas incorporate the most durable and reliable spa heater on the market. The variable output on this stainless steel heater provides optimal heat recovery and lower energy consumption.

• **100 Percent Insulated:** D1 was the first company to manufacture a fully insulated spa for inground or aboveground use. The hot tubs are 100 percent foam insulated with closed-cell urethane—used in commercial freezers—not only absorbing equipment noise for the quietest operation possible, but also minimizing heat loss to ensure the lowest energy costs. Additionally, high-density E-Z Lifter foam covers are precision fitted with linear heat seal seams to prevent heat loss. D1 spas use up to 85 percent less energy than traditional in-ground, non-insulated spas.

• **HydraMax® Pumps:** The D1 aquatic massage system is backed by powerful HydraMax aquatic jet pumps. These pumps are expertly engineered and plumbed for 100 percent efficiency—this means a smaller, more efficient, and nearly silent pump that retains the jet power of its larger counterparts.

• **M•Drive:** D1's cutting-edge M•Drive, available exclusively on the company's high-end Bay Collection series hot tubs is a highly intuitive, menu-driven spa controller, which provides effortless control over virtually every aspect of a spa's operations and functions. M•Drive features large buttons; a wide, brightly lit, easy-to-read screen; and an intuitive menu structure that makes the M•Drive an ergonomically friendly spa controller.

The Amoré Bay features the transformative use of lights, sights, sounds, colors, and Liquid FX hot water effects to evoke a transcendent hot tub experience unlike any other. Other features include roomy, barrier-free seating; bar top accent lighting; stylish architectural uplighting; the industry's first and only four-foot water brook; three water fountains; and two UltraLounges.

At the recent Aqua Expo at the Mandalay Bay Resort in Las Vegas, I met with Amoré Bay designer Victor Walker and Michael Mantell, PhD, a successful psychologist and D1 consultant. We discussed Amoré Bay design's eco-friendly concept and the "Shangri-La" features, which include curvaceous soft, smooth lines and edges; 64 strategically placed accent ring jets; a special 8-foot "playground" area; underwater massage lounges with acupressure massage jets; a hand-held massager; cup holder; and mood lighting. Impressively, the experience is delivered at a heating cost of approximately $15.00 a month. We also discussed "water" as a desirable biophilic attribute and various health topics such as oxytocin—the

Finnleo® Custom-Cut Finnish Sauna

• A Finnleo® Custom-Cut Sauna with a floor-standing Maxi Soft Heat 6 kW heater has been specified with 70 pounds of Finnish Vulcanite rock. The authentic Finnish sauna features European styling with a striking touch of elegance in a healthy environment that provides traditional soft dry heat.

mammalian hormone known by sex researchers as the "cuddle hormone," and believed, by some researchers, to be a beneficial link between oxytocin and social anxiety, memory control, cardiovascular functions, and thermoregulation in menopausal women. Wow! We also discussed water's power to invigorate the spirit, replenish the soul, refresh the mind, and relax the body, while helping to wash away tension, rekindling relationships, and igniting passions.

Dimension One Spas' Amoré Bay hot tub seats up to seven adults with a water capacity of 415 gallons. The spa will be sunken into an area of the courtyard so that the spa's ledge is at a seating height for easier accessibility. Users simply sit on the spa's wraparound IPE deck seating and slide over into the spa. The spa area design complies with the universal design accessibility standards for the home.

The Valentine 2008 limited edition Amoré Bay spa will be installed. The tub's color is Candy Apple Red with EnviroTect tan architectural trim.

Finnleo Finish Sauna

A Finnleo Custom-Cut Sauna will be a featured experience in the Optimum Performance Home. The authentic Finnish sauna features European styling with a striking touch of elegance in a healthy environment that provides traditional soft dry heat that can be enjoyed wet or dry.

The benefits of traditional Finnish sauna bathing are legendary:

• Relaxes muscles and soothes aches and pains in muscles and joints
• Relieves stress
• Induces a deeper sleep
• Provides recreational and social benefits
• Flushes toxins and cleanses skin
• Improves cardiovascular performance
• Burns calories
• Fights illness
• Relieves congestion
• Feels good

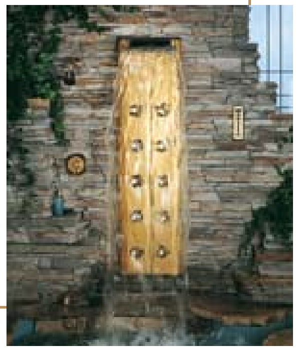
Every Finnleo sauna is handmade using the highest quality sustainable Scandinavian Nordic White Spruce for the tongue-and-groove walls and ceiling, and Abachi for the benches, backrests, headrests, duckboards, and heater guard. The benches are assembled from the

Rais & Wittus Firebird Outdoor Fireplace/Grille

• The Firebird by Rais & Wittus is made of durable Cor-Ten steel, which permanently oxidizes to form a rich reddish brown coating. Built to be maintenance free and to last a lifetime, the Firebird will be used as an outdoor fireplace and barbeque grill and enjoyed as outdoor sculpture.

Kohler® BodySpa Ten-Jet Tower

• A Kohler® outdoor shower will service the Dimension One Spas® Amoré Bay hot tub and the Finnleo® Finnish sauna. The shower assembly will be the Kohler BodySpa Ten-Jet Tower (K-1000-H2) with separate Kohler MasterShower® Rite-Temp® valve trim with cylinder handle (K-T9492-7) and Kohler MasterShower Hotel Handshower Kit (K-8520).



Runco Climate Portfolio™ WP-42HD LCD Monitor

• The Runco Climate Portfolio™ and its WP-42HD ruggedized weatherproof LCD high-definition display delivers stellar video quality and performance to the outdoors. Advanced LCD technology and glass with special element-proof bonding is used to deliver a high-definition widescreen flat panel monitor ready for the elements.

bottom with stainless steel screws. Abachi is used extensively throughout, as it remains comfortable to the touch even at high temperatures. The clear Abachi wood is an ideal match for a Nordic White Spruce sauna and the premium wood of choice for sauna benches worldwide. The source of this wood is certified as well.

Finnleo's exclusively designed heaters are the heart of the sauna bathing experience. A wall-mount Maxi Soft Heat FSO-60SC 6 kW heater and separate Digi-1 control have been specified with 70 pounds of Finnish Vulcanite rock for a soft, even-temperature heat with a soft steam rising from the rocks. The Maxi Soft Heat series, with its sleek stainless steel symmetrical design, exemplifies the sauna experience.

The wall-mounted Digi-I features include: light switch, ventilation fan switch, clock, set operating time and time remaining, set temperature and actual temperature, and 24-hour programmability. Set the sauna in the evening before bedtime, and wake up to the start of the day with a healthful sauna bathing experience at the perfect temperature.

The sauna measures seven-feet-wide by five-feet-deep and will be fitted with a Douglas fir 36-inch-wide door with a 26- x 65-inch double-pane tempered insulated glass window to meet the energy-saving and universal and biophilic design criteria for the home. The floor will be an extension of the slate flooring in the courtyard, with a no-barrier entry.

Various Finnleo sauna accessories are specified, including a one-gallon copper water bucket, copper ladle, 15-minute sand timer, vapor-proof sauna wall light and lampshade, headrests, beech and aluminum frame thermometer, beech and aluminum frame hygrometer, wooden vent grill and ventilation valve, four-peg clothes hanger, pair of Nordic Pine handles, and Abachi wood sauna sign with a green border.

Rais 7 Wittus Firebird Outdoor Fireplace/Grille

A Firebird outdoor barbeque grill and fireplace, created by award-winning Danish architectural designer Bent Falk, will be featured in the courtyard. The Firebird by Rais & Wittus is made of durable Cor-Ten steel, which permanently oxidizes to form a rich reddish brown coating. Built to be maintenance-free and to last a lifetime, the Firebird will be used as an outdoor fireplace and barbeque grill, and enjoyed as outdoor sculpture. The grill has adjustable grill racks that are made of heavy solid stainless steel 5mm rods. The innovative design features stay-cool handles, a built-in warming and frying surface in back where one can simmer sauces or sauté vegetables, and a neat way to store the grill rack when not in use. The chimney creates a strong draft for faster-built fires and then "funnels" the smoke up and away from the chef—and nearby guests.

Kohler BodySpa Ten-Jet Tower Shower

The outdoor shower assembly will service the D1 spa and the Finnleo Finnish sauna. The shower assembly will be the Kohler BodySpa Ten-Jet Tower (K-1000-H2) with separate Kohler MasterShower® Rite-Temp® valve trim, cylinder handle (K-T9492-7), and Kohler MasterShower Hotel

Handshower Kit (K-8520). The BodySpa Tower is made from tough anodized aluminum for durability in the outdoors. It features ten-jet system waterfall and chromatherapy lighting, electronic jet selection control, remote control, and variable water flow control. A separate wall-mount Kohler Roman Bath Diverter Spout (K-6881) also will be installed.

The shower walls will be surfaced with Moving Color™ Northern Lights 4 x 4 glass tiles. These innovative waterproof glass tiles are manufactured using the "color infinity," enabling the glass tiles to change hue dynamically, responding to applied heat. The tiles appear black at room temperature and move through the color spectrum when temperature (warm water, radiant heat, etc.) is applied. The moving color is dynamic to the temperature of the heating agent. The shower's ceiling and sidewalls will be fabricated with the UltraGlas® UlraSea® design.

Runco Outdoor Weatherproof High-Definition LCD Display

High-performance outdoor video will be provided by Planar Systems' Runco custom home theatre brand. The new Runco Climate Portfolio™ and its WP-42HD ruggedized weatherproof LCD high-definition display delivers stellar video quality and performance to the outdoors. The WP-42HD utilizes advanced LCD technology and glass with special element-proof bonding to deliver a high-definition widescreen flat panel monitor ready for the elements. Featuring a 1366 x 768 native resolution, combined with Runco's exclusive Vivix™ internal video processing for outstanding imagery, artifact-free scaling and pristine reproduction of both native film and native video formats (480p, 720p, 1080i), the WP-42HD delivers exceptional video quality, features, flexibility, and connectivity to achieve the ultimate custom outdoor viewing experience.

Engineered for maximum durability, the WP-42HD's weatherproof enclosure ensures protection from adverse environmental conditions including temperature, exposure to moisture, dust, oils, and intermittent direct water spay. The custom aluminum cabinet is sealed to ensure protection from the elements and features a specially designed internal ventilation system to provide adequate cooling.

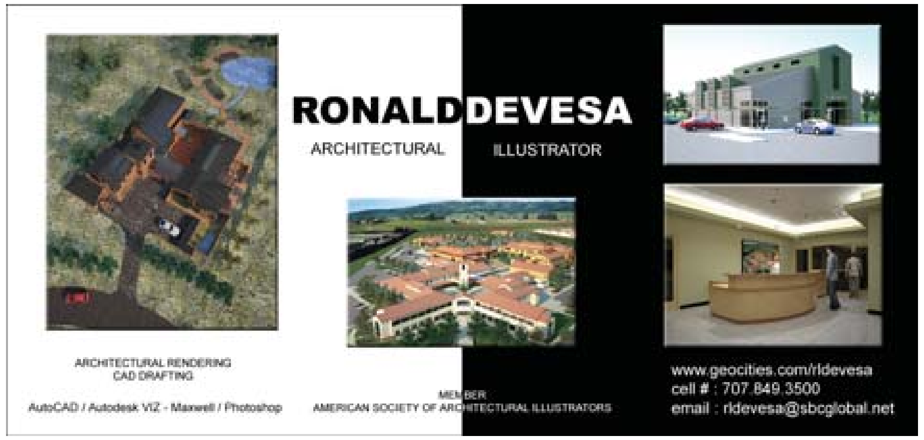
The display has a wide viewing angle (178 degrees) to maximize viewing enjoyment from widely dispersed seating positions, including viewing by those enjoying the Amoré Bay spa. The WP-42HD features a

K2 Mounts Motorized Flat Panel Mount

• The K2 Mounts remote-controlled motorized flat panel display mount provides telescopic control to 12 inches out from the flush wall mount and can be tilted 7 degrees up and 20 degrees down, and swivel 56 degrees right to left.

KitchenAid® Outdoor Courtyard Kitchen Appliances

• The fully equipped outdoor kitchen features exclusive KitchenAid® stainless steel-constructed appliances.



For more information on this advertiser, circle 09

high-gloss black bezel incorporated into a stylish enclosure design.

A K2 Mounts remote-controlled motorized flat panel display mount will provide telescopic control to 12 inches out from the flush wall mount on the exterior equipment wall door. This will allow the Runco WP-42HD to be tilted 7 degrees up and 20 degrees down, and to swivel 56 degrees right to left, assuring full view of the monitor from just about anywhere in the courtyard.

A custom-designed outdoor high-performance surround audio system will be installed by James Loudspeaker.

KitchenAid Outdoor Kitchen

The fully equipped outdoor courtyard kitchen will feature KitchenAid 304 stainless steel construction appliances. The 36-inch-wide built-in grill (KBNU367TSS) features a 23K BTU infrared sear burner, two 22.5K BTU U-shaped stainless steel main burners, and a 15K BTU infrared rotisserie burner and 36-inch wide rotisserie. Next to the grill will be a 13-inch-wide built-in double side-burner (KBZU122TSS), front to back, with two 15K BTU burners. Under the grill will be a 24-inch-wide built-in warming drawer with slow-cook functionality.

A KitchenAid 30-inch-wide built-in refreshment center (KBFU271TSS) with integrated stainless steel sink and single-control faucet will be featured along with a 24-inch-wide built-in 6.0 cubic foot refrigerator (KRCA06XPSS). There will also be a 15-inch-wide built-in automatic ice maker with a 28-pound storage capacity (KUIO15NNLS).

A KitchenAid 27-inch-wide wheeled serving cart (KFBS170LSS) will be included in the outdoor entertainment package along with a 24-inch-wide built-in double utility drawer unit (KBUU142TSS) and a 14-inch-wide built-in trash drawer (KBTU141TSS).

Next

Now that we have broken ground and commenced site preparation, this continuing series of articles will focus on the design elements as they pertain to each stage of construction, and will include coverage of the technologies and building systems and the materials used and applied to construct the first Optimum Performance Home. **UHD**

The Author

Gary Reber is the President of Ultimate Home Design, Inc. and the founding Editor-In-Chief and Publisher of *Ultimate Home Design*®, The Optimum Performance Design & Build Resource For Environmentally Enhanced Lifestyle Living™. He is also President of WSR Publishing, Inc, which publishes *Widescreen Review*®, The Essential Home Theatre Resource™. His diverse background in several fields includes an undergraduate, graduate, and postgraduate university education in architecture, community planning, and economic development planning. For years he was a consultant on community and economic development planning. For the past 15 years he has been an editor and publisher of magazines in the consumer electronics field. Gary can be reached at 951 676 4914 or gary@ultimatehomedesign.com.

Product And Contact Information

- AEC Software, 2261-113 Markey Court, Sterling, Virginia 20166, 800 450 1985, www.aecsoftware.com
- Bartlett, 408 313 2486
- Bill Wilson Environmental Planning & Design, LLC, 71 Del Casa Drive, Mill Valley, California 94941, 415 383 2919, 805 689 7639
- Dimension One Spas, 2611 Business Park Drive, Vista, California 92081, 800 345 7727, www.d1spas.com
- Dimplex North America Ltd., 1367 Industrial Road, Cambridge, Ontario, NIR 7GB Canada, 519 650 3630, www1.dimplex.com
- EchoStar DISH Network, 9601 South Meridian Boulevard, Englewood, Colorado 80112, 888 825 2557, www.dishnetwork.com
- Feeney Construction, 14660 McCourtney Road, Grass Valley, California 95945, 530 477 7647, 707 884 9458
- Finnleo/Saunatec, 575 East Cokato Street, Cokato, Minnesota 55321, 320 286 5584, www.finnleo.com
- Healthy Building Network, Institute For Local Self-Reliance, 927 15th Street, NW, 4th Floor, Washington, DC 20005, 202 898 1610, www.healthybuilding.net
- iBeam Systems, Inc., 280 North 8th Street, Suite 30, Boise, Idaho 83702, 800 403 0688, www.ibeamsystems.com
- James Loudspeaker, 30 Harlow Court, Napa, California 94558, 707 449 0880, www.jamesloudspeaker.com
- Kohler Company, 444 Highland Drive, Kohler, Wisconsin 53044, 920 457 4441, www.kohler.com
- K2 Mounts, 14726 Ramona Avenue, Suite 201, Chino, California 91710, 866 526 6868, www.k2mounts.com
- LifeSize Communications, 901 South Mopac, Building 3, Suite 300, Austin, Texas 78746, 512 347 9300, 877LIFESIZE, www.lifesize.com
- Marin Outdoor Living, 2100 Redwood Highway, Greenbrae, California 94939, 415 924 8811, www.marinoutdoorliving.com
- New Resource Bank, 405 Howard Street, Suite 110, San Francisco, California 94105, 415 994 8100, www.newresourcebank.com
- Planar Systems, Inc., 1195 NW Compton Drive, Beaverton, Oregon 97006-1992, 866 475 2627, www.planar.com
- Rais & Wittus, Inc., 40 Westchester Avenue, Pound Ridge, New York 10576, 914 764 5679, www.rais.com / www.wittus.com
- Runco International, 2900 Faber Street, Union City, California 94587, 510 324 7777, www.runco.com
- Sonoma County Builders, Inc. 6280 Old Redwood Highway, Santa Rosa, California 95403, 707 837 2997 / P.O. Box 244, Point Arena, California 95468, 707 684 9144
- Spunstrand Incorporated, 620 North Post Street, Post Falls, Idaho 83854, 208 665 7444, www.spunstrand.com
- Steve Glaze Backhoe, 2766 Parkview Drive, Lakeport, California 95453, 707 263 3055
- Steve Michelson Productions, Lobitos Creek Ranch, 2800 Lobitos Creek Road, Half Moon Bay, California 94019-2547, 650 726 2460, www.lobitoscreekranch.com
- WaterFurnace International, Inc., 9000 Conservation Way, Fort Wayne, Indiana 46809, 800 222 5667, www.waterfurnace.com
- Weeks Drilling & Pump Company, 6100 Highway 12, Sebastopol, California 95472, 707 823 3184, www.weeksdrilling.com
- WildBlue Communications, Inc., Greenwood Corporate Plaza, Building. 1, 5970 Greenwood Plaza Boulevard., Suite 300, Greenwood Village, Colorado 80111, 866 945 3258, www.wildblue.com
- Whirlpool Corporation/KitchenAid, 2000 M63 North, Benton Harbor, Michigan 49022, 269 923 5000, www.kitchenaid.com
- Wonderwater, P.O. Box 1510, Mt. Shasta, California 96067, 530 926 5050, 530 925 2586, www.wonderwater.net

Interview With Peter Liu, Founder And Vice-Chairman
New Resource Bank, San Francisco

Gary Reber

Gary Reber, *Ultimate Home Design*: Peter, I want to thank you for supporting the Optimum Performance Home® project. Let's talk about the concept, your concept, behind New Resource Bank.

Peter Liu, New Resource Bank: We're a bank. We are here to serve our clients, whether through simple checking accounts or through business and construction lending. When clients bank with us, we can take their deposits and put them into resources that help promote the sustainability of our communities. This means that we often work with clean technology companies or people building "green buildings," or an entrepreneur who's trying to sell a product or service that's greener or healthier or more resource efficient.

***UHD* Reber:** Why the focus on "green?"

Liu: We think it's going to be a major market opportunity. "Green" is changing from a social movement to a market movement. Consumers now want "green," whether through their consumption of organic foods to driving hybrid automobiles. People are increasingly making it a key factor in their consumption choice.

***UHD* Reber:** So, is the position of the bank such that you hope to attract consumers and investors with like-minded goals for "green" and sustainability?

Liu: Yes, I think the number one goal is to deliver world-class banking service. So first of all, the service that they get as a bank is better than where they came from, and second is that their deposit dollars are no longer taken for granted. When people think of their bank account, they don't think about how money in that bank can work towards their values. Now with banks like New Resource Bank, they realize they can get great banking and at the same time have their money work toward something that's more consistent with their values.

***UHD* Reber:** What distinguishes you from other banks or financial institutions that can lend money for green or non-green, or for anything?

Liu: We lend money to "green" and non-"green" businesses as well, but our differentiation is that we have a more value-added approach to "green" businesses and projects. For example, to a "green building" project, we give more money at a lower cost. When people come to us with a building project, they'll get two pricing options. One is for the conventional building; the other is to a client who is looking to build to a "green"-leadership level. If you're doing the latter, we'll actually give a better price.

***UHD* Reber:** Did you come up with this marketing orientation, and if you did, what drove you to…

Liu: Yes, I came up with the idea, but it's been embraced and been helped by many, many other great co-founders and founding investors of the bank. The people who support this bank are among some of the best entrepreneurs this country has seen, people who have changed the way we compute, change the way we use the Internet, even change the way that we make carpets—someone like Ray Anderson of Interface. I first came up with the idea while helping our state treasurer's office to convince our two large state pension funds to invest in "green." After that successful effort, I believed that it was time for a bank to join other capital providers and meet the green-market opportunity head on.

***UHD* Reber:** Is there a connection with the bank and the pension fund?

Liu: No. The idea was inspired by work and conversations that came out of the effort to get the funds to invest in "green." I realized that the green business community really wanted a bank like New Resource.

***UHD* Reber:** How did you come up with the name "New Resource Bank?"

Liu: New Resource Bank stands for what we do. It's really part of our DNA. Number one, we're here to set a "NEW" standard of service. If you just offered the old level of service, you have no reason to be here. Second, "Resource," we are taking our depositors' dollars and funding sustainable "resources" in our community. Lastly, we're a "Bank" that does more with our customers' money. Again, they get great service plus banking their values. So each letter there stands for part of what we're trying to deliver.

***UHD* Reber:** What's the reach of the bank? Is there any territorial restriction?

Liu: Right now we're focused more in the greater San Francisco Bay Area and Northern California. Some of our programs, like our solar-lending program, is statewide. We will expand, but will also take steps prudently.

***UHD* Reber:** How does someone proceed with a "green building"

enterprise-financing request or a "green building" construction project?

Liu: I think number one is they have to have the right project, a project that makes sense economically. I mean, a green project that doesn't make sense economically is still a bad project. So, what does "make sense economically" mean? It means that they're building it at a level that makes sense for the market in which they're either trying to sell it or rent it or use it for themselves. So you're not going to get into a situation where you're over-leveraged, where you can't pay the debt service. Once the economics are there, there are lots of resources that we can help people access on "green building" options. Whether it's just knowledge, whether it's contractors, or whether it's suppliers, we're well networked in the space and can help people get to the green, if you will.

***UHD* Reber:** In the process of doing our Optimum Performance Home project, I've come across quite a few mortgage people who want to be "green," want to do something "green," do you work with any of those kinds of people?

Liu: Not so much so. We haven't been active in the single-family mortgage space that much because it's something that we haven't figured out a way in which to add value. So much of that is commoditized. What we try to do, is to, again, try to add value for people who are trying to build a building or build a community. So, on the mortgage side, we're not that active.

***UHD* Reber:** Were there any factors in our Optimum Performance Home project that triggered you to support it?

Liu: Firstly, the economic fundamentals are right. We understand The Sea Ranch community, we understand how the supply and demand dynamic there is a very attractive one, so the base project's attractive, and second, we definitely love the fact that it's using "green" principles and aiming for a "green"-leadership level in a community that has a lot of its founding principles in conservation and preservation. So it really fit both the market and the development.

***UHD* Reber:** Let's talk about that solar project, with SunPower Corporation. How did that come about and what are the mechanics of that program?

Liu: We developed that program with SunPower, and since then we've also implemented with other solar providers. So basically, we are providing an option for a homeowner to get solar with no money down. For a $50,000 or $60,000 system, a

Peter Liu
Founder And Vice-Chairman
New Resource Bank

homeowner may have to choose between liquidating some of their investments or taking money from their retirement funds if they don't have the cash on hand. With our financing, they can just pay a monthly bill. That monthly bill, in fact, through our financing, has been structured to be somewhat equivalent to his or her existing utility bill, which everybody has to pay for anyways. Once you get solar, that utility bill goes down, the new bill comes in roughly at a similar size or lower. So you get green power with no money down while potentially saving money every month.

***UHD* Reber:** Fantastic! And you've expanded that beyond SunPower now.

Liu: Yes, we have.

***UHD* Reber:** Peter, I believe that you know, we're also incorporating wind power in the Optimum Performance Home at The Sea Ranch. That's a first for any home at The Sea Ranch.

Liu: Wind power may be applicable in fewer locations, and there's more of a neighbor's issue, and so forth. But obviously in the right place, wind power has proven to be a good option. Utility-scale wind power is starting to become more economical than some of the conventional fossil-fuel-fired options.

***UHD* Reber:** When did you found New Resource Bank?

Liu: The bank opened in late 2006. I started thinking about the idea maybe two-and-a-half years ago. A bank has to be chartered by federal and state agencies because the bank is a very safe environment for people to put their money; it's guaranteed by the government. The government wants to make sure that your bank is safe and sound in the standard that they require.

***UHD* Reber:** Do you have more than one branch, other than the main office on Howard Street in San Francisco?

Liu: We have a couple of offices but one branch at Howard and Fremont in San Francisco. We have clients from all over the country and even from other parts of the world because a lot of people use the online banking services. They can open an account online and they become depositors because they can use any bank ATM in the world for free, so the convenience is there, and the service is great, and

DESIGN
optimum performance home

again, they get to bank their values.

***UHD* Reber:** How do they use ATM machines around the world with no charge?

Liu: They can use any bank ATM. They will accept the fees that the bank accesses them, and then we rebate them.

***UHD* Reber:** That is a real benefit. What major green projects are you financing right now?

Liu: Well, they range from all sectors, so we are working with clean technology companies and solar power companies to finance specific solar systems. We're also working with "green" builders to build both home, as well as commercial real estate projects. We are also working with some of the leading players in the "green" consumer product lines, including some wonderful leading organic industry companies like Straus Family Creamery and Cowgirl Creamery.

***UHD* Reber:** Fantastic. So where do you see New Resource Bank in two years?

Liu: In two years, I think we're going to continue to grow rapidly. One of the number one questions that's asked of us is, "When will New Resource Bank come to our community?" by people from as far as South Carolina, from as near as Palo Alto. When there are a lot of customers that want us to be part of their community, we're going to take that challenge upon us to try to satisfy the demand.

***UHD* Reber:** And you made reference to, when you finance a project, it costs less to finance through you if it's a green project. What are the incentives?

Liu: Yes, we give them a price break. They get a slight discount. Again, we do so to further incentivize people to build to a "green"-leadership level, but the underwriting still has to be based on traditional risk matrix, which includes leverage, liquidity, location, and experience of the builder. So, we're not here to finance projects that don't make good economic sense.

***UHD* Reber:** Do you have any comments you would like to make that I haven't covered?

Liu: Number one is we are a bank first and foremost, so we always focus on delivering banking in the best possible way. We expect our bank to have that core functionality as its primary focus. Additionally, we are a "green" bank that understands our "green" business customers better so we can roll out innovative programs. Better banking plus that additional element will hopefully make it a no-brainer for some people to say, "Hey, I should bank at New Resource Bank."

***UHD* Reber:** Thank you, Peter, for sharing with our readers the story behind the New Resource Bank. UHD

For more information on this advertiser, circle 10

LEED® For Homes: Launched!

part IV: post pilot

Ann V. Edminster,
M.Arch., LEED AP

On December 5, 2007, after a two-year pilot in 12 regions, the U.S. Green Building Council (USGBC) launched its member-approved version of the LEED® For Homes Rating System for nationwide use. LEED is the anagram for Leadership In Energy & Environmental Design. Early in 2008, USGBC will select LEED For Homes Certification Providers to serve 20 additional North American metropolitan areas. (The pilot regions and providers are listed in the sidebar.)

The new national version of the rating system incorporates an array of improvements developed in response to comments received during two public review cycles leading up to the 30-day membership ballot. As is true for all of the LEED rating systems, flaws remain; there is always room for further improvement. However, the vast majority of comments were successfully addressed and resulted primarily in relatively subtle refinements and clarifications. By and large, the review process reinforced the pilot response from a diverse spectrum of U.S. builders and developers: the rating system is highly functional and broadly appealing.

Just The Facts, Ma'am

The new rating system (v2.0) [version #/name to be confirmed] comprises:

- Four award levels—certified, silver, gold, and platinum
- Eight rating categories, several with minimum point "floors" (see sidebar)
- 44 credits or "topic areas" with discrete intents
- 18 mandatory measures (also called prerequisites)—or 24 if you're not also qualifying for the ENERGY STAR® Homes label, which most projects do
- 135 possible points overall

The minimum qualifications for earning a LEED rating award are to:

- Comply with all the mandatory measures (no exceptions!)
- Achieve the specified minimum scores in the categories with point floors
- Earn the minimum number of points required for the certified award level (45 for average-sized homes, fewer for smaller homes, more for larger ones)

The principal rating system changes, by category, are highlighted below. No substantive changes were made to the Innovation & Design Process or Awareness & Education categories.

Location & Linkages

LL1. LEED-ND Neighborhood. The LEED for Neighborhood Development (LEED-ND) program pilot opened in mid 2007. Residential developments within the 238 pilot projects now are eligible to earn this credit (worth 10 points), which was previously unavailable.

Sustainable Sites

SS1. Site Stewardship. For consistency with other credits, the development density above, which projects automatically earn this credit, has been changed from 1/8-acre average per unit to 1/7-acre average per unit. Provisions have also been made for the rehabilitation of previously developed sites.

SS3. Local Heat Island Effects. The title of this credit has been changed from "Shading of Hardscapes" to reflect the inclusion of low-reflectance hardscape materials as well as

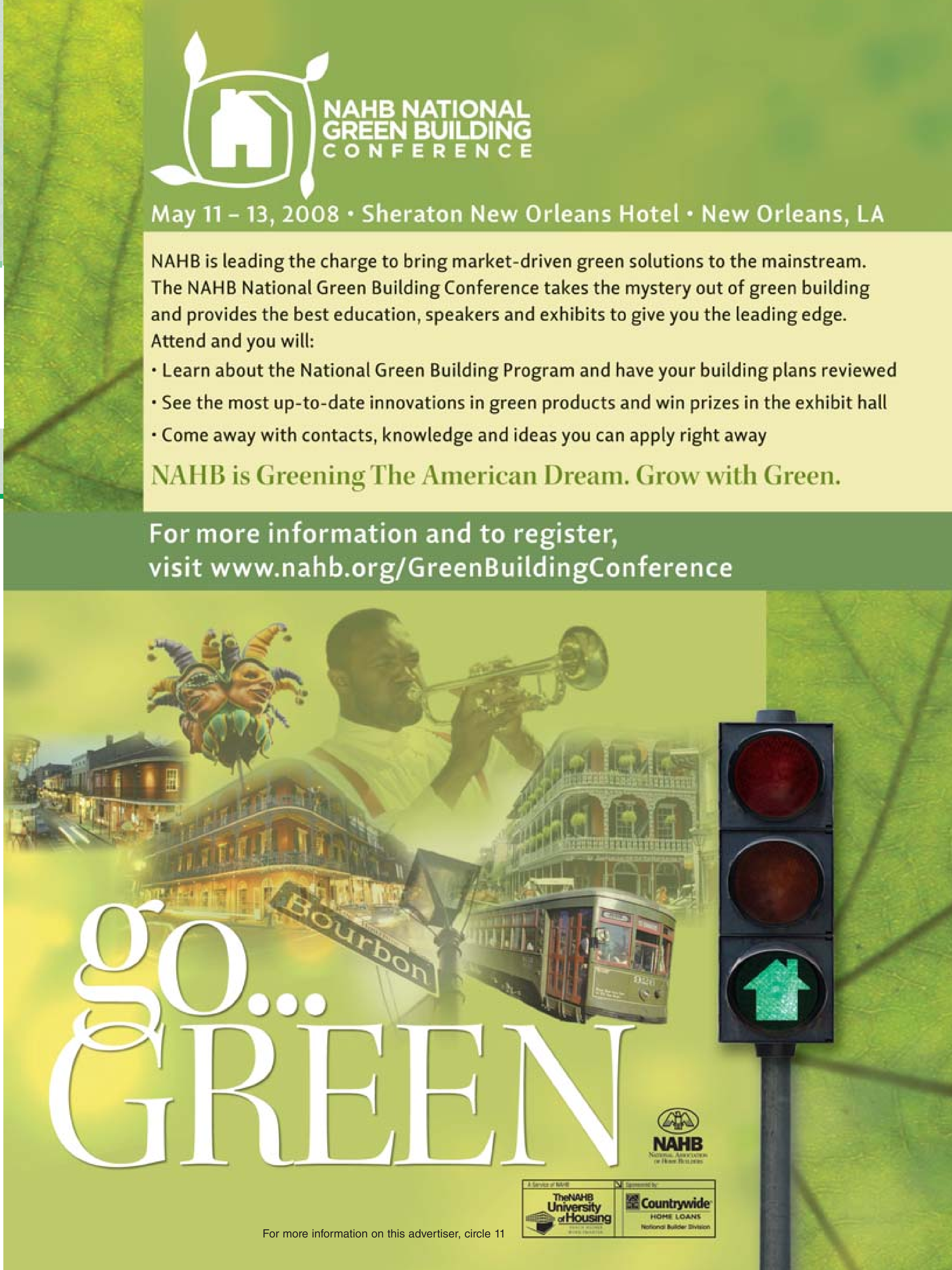


Table 2. LEED For Homes Providers By Location

Location	Region Served	Contact
Arizona	Scottsdale & Metro Phoenix	Anthony Floyd Green Building Program Manager City of Scottsdale Green Building Program 480 312 4202 afloyd@scottsdaleaz.gov
California	Statewide	Patti Heath Davis Energy Group, Inc. 530 753 1100 x11 leed@davisenergy.com
Colorado	Statewide	Kristin Shewfelt E-Star Colorado 303 444 4149 x462 kshewfelt@archenergy.com
Connecticut	Statewide	Maureen Mahle Project Manager Steven Winter Associates 203 857 0200 x216 mahle@swinter.com
	Northwestern Connecticut	Megan McDonough Builder Services Administrator Center for Ecological Technology (CET) 413 586 7350 x21 meganm@cetonline.org
	Northeastern Connecticut	Mark Price Residential Project Manager Conservation Services Group 508 836 9500 x13269 mark.price@csgrp.com
Florida	Statewide	Eric Martin Senior Research Engineer Florida Solar Energy Center/ University of Central Florida 321 638 1450 martin@fsec.ucf.edu
Georgia	Alabama, Georgia, South Carolina, Virginia	LaTaunynia Campbell Southface Energy Institute 404 604 3626 lcampbell@southface.org
Maine	Statewide Maine	Danuta Drozdowicz Fore Solutions 207 347 5066 danuta@fore-solutions.com
Massachusetts	Central/Eastern Massachusetts (Worcester & All Counties East)	Mark Price Residential Project Manager Conservation Services Group 508 836 9500 x13269 mark.price@csgrp.com
	Berkshire, Franklin, Hampden, & Hampshire Counties	Megan McDonough Builder Services Administrator Center for Ecological Technology (CET) 413 586 7350 x21 meganm@cetonline.org

shading. Further, a partial list of credit-worthy hardscape options has been included: white concrete, gray concrete, and the vegetated fraction of area covered by open pavers.

Water Efficiency

WE1. Water Reuse. WE1.2 newly specifies that gray water must be collected from at least one of the following: clothes washer, showers, or some combination of faucets, dishwashers, etc., estimated to exceed 5,000 gallons per year.

WE3. Indoor Water Use. Lavatory faucets certified as meeting the U.S. EPA's WaterSense™ specification qualify as an alternate to faucets meeting the flow rate of 2.0 gallons per minute or less. Dual-flush toilets and toilets certified as meeting the U.S. EP's WaterSense specification qualify as an alternate to toilets meeting the flush rate of 1.3 gallons per flush or less.

Energy & Atmosphere

EA1. Optimize Energy Performance. Formerly titled "Energy Star Labeled Home," one additional requirement has been added to this credit—proof of proper refrigerant charge must be provided for homes that include air-conditioning systems. (This prerequisite was part of EA6.1 in earlier versions.)

EA4. Windows. In addition to requiring that windows at least qualify for ENERGY STAR labeling or achieve equivalent performance, the mandatory measure (EA4.1) now also requires that skylights meet ENERGY STAR skylight performance requirements and not exceed 3 percent of floor area. The credit requirements now also apply to glass doors.

EA6. Space Heating And Cooling Equipment. Installation of an ENERGY STAR-labeled programmable thermostat is no longer mandatory.

EA7. Water Heating. Structured plumbing systems and central manifold systems now must include R4 insulation on the circulation loop (structured) or trunk (manifold).

EA8. Lighting. The fixtures used to earn EA8.2 must be installed in high-use rooms.

EA10. Renewable Energy. This credit has been revised to grant 1 point for each 3 percent, rather than for each 5 percent, of annual electrical load met by the renewable energy system. The credit also now specifies that energy modeling be used to determine the fraction of load met by the renewable system.

Materials & Resources

MR1. Material-Efficient Framing. Three new sub-credits have been added. MR1.2 offers 1 point for the creation of "detailed framing plans or scopes of work and accompanying architectural details for use on the job site." MR1.3 offers 1 point for the creation of "a detailed cut list and lumber order that corresponds directly to the framing plans and/or scopes of work," provided that MR1.2 is also earned. MR1.5 offers 4 points for the use of off-site fabrication—either panelized construction or prefabricated modules used for all principal building elements. The list of measures rewarded under MR1.4 (formerly MR1.2), Framing Efficiencies, also has been somewhat modified.

MR2. Environmentally Preferable Products. A number of new products have been added to the extensive table of alternatives provided:

- Exterior wall framing/structure—30 percent fly ash or slag replacing Portland cement in concrete wall structures has joined FSC-certified lumber; reclaimed or finger-jointed studs are other new options.
- Flooring—hard-surface flooring that is SCS (Scientific Certification Systems) FloorScore certified has been added

Table 2. LEED For Homes Providers, By Location Continued

Location	Region Served	Contact
Michigan	Central & West Michigan	Jeannine Reynolds The Alliance for Environmental Sustainability 616 458 6733 info@alliancees.org
New Hampshire	Southern and Central New Hampshire	Paul Leveille High-Performance Building Coordinator The Jordan Institute 603 226 1009 x205 pleveille@thejordaninstitute.org
	Northern New Hampshire	Peter Schneider Project Manager Vermont Energy Investment Corporation 802 658 6060 x1141 pschneider@veic.org
	Northern New Hampshire	Mark Price Residential Project Manager Conservation Services Group 508 836 9500 x13269 mark.price@csgrp.com
New Jersey	New Jersey & Eastern Pennsylvania	Robert E. Wisniewski Magrann Associates 240 West Route 38 Moorestown, NJ 08057 856 722 9799 (office) 865 296 1988 (cell) 856 722 9227 (fax) greenbuilding@magrann.com
New York	Statewide New York	Maureen Mahle Project Manager Steven Winter Associates 203 857 0200 x216 mahle@swinter.com
	Rensselaer and Columbia Counties	Megan McDonough Builder Services Administrator Center for Ecological Technology (CET) 413 586 7350 x21 meganm@cetonline.org
	Suffolk County (Eastern Long Island)	Peter Schneider Project Manager Vermont Energy Investment Corporation 802 658 6060 x1141 pschneider@veic.org
Oklahoma	Central U.S.	Donney Dorton Plans Department Supervisor Guaranteed Watt Saver Systems, Inc. 405 946 0206 ddorton@gwssi.com
Oregon	Oregon and Southern Washington	Randy Hansell Senior Green Building Consultant Earth Advantage, Inc. 503 968 7160 x16 rhansell@earthadvantage.org

Table 2. LEED For Homes Providers By Location Continued

Location	Region Served	Contact
Pennsylvania	Eastern Pennsylvania & Delaware	Liz Robinson Energy Coordinating Agency of Philadelphia 215 988 0929 x233 lizr@ecasavesenergy.org
Rhode Island	Statewide	Mark Price Residential Project Manager Conservation Services Group 508 836 9500 x13269 mark.price@csgrp.com
Texas	Statewide	Chip Henderson Program Coordinator Contects-Consultants & Architects 210 824 8758 chip@contects.com
Vermont	Statewide	Peter Schneider Project Manager Vermont Energy Investment Corporation 802 658 6060 x1141 pschneider@veic.org
Canada	Central and Eastern Provinces, Canada	Peter Schneider Project Manager Vermont Energy Investment Corporation 802 658 6060 x1141 pschneider@veic.org
	Eastern Provinces, Canada	Danuta Drozdowicz Project Manager Fore Solutions 207 347 5066 danuta@fore-solutions.com

as an acceptable emission specification.

- Interior paint—recycled-content paint that meets Green Seal standard GS-43 is now accepted.
- Cabinets—in order to earn EPP credit, synthetic or composite materials must contain no added urea-formaldehyde resins.
- Counters—in order to earn EPP credit, synthetic or composite materials must contain no added urea-formaldehyde resins; the listing has also been expanded to include both kitchen and bathroom counters.
- Trim—in order to earn EPP credit, synthetic or composite materials must contain no added urea-formaldehyde resins.

Indoor Environmental Quality

IEQ2. Combustion Venting. The requirements to earn credit under IEQ2.2 have been somewhat simplified. Natural gas and propane fireplaces no longer need to meet the ANSI Z21.88/CSA 2.33 harmonized standard in order to earn 1 point; however, to earn 2 points they now must include an electronic (not standing) pilot. Wood stoves and fireplace inserts are required to be "listed by an approved safety testing facility…and either be EPA certified or…with a catalytic combustor must emit less than 4.1 g/hr of particulate matter, and…without a catalytic combustor must emit less than 7.5 g/hr of particulate matter. Pellet stoves may now qualify simply by being EPA certified.

IEQ4. Outdoor Air Ventilation. IEQ4.2 now requires that heat-recovery systems be listed by a certified testing lab. Guidance for exhaust-only ventilation systems has been added to IEQ4.3.

IEQ5. Local Exhaust. Continuously operating exhaust fans now qualify for credit under IEQ5.2. The following note has also been added to the discussion of synergies and trade-offs: "If designed properly, exhaust fans can also be used to provide the outdoor air ventilation system for the entire house, as required by IEQ prerequisite 4.1."

IEQ8. Contaminant Control. Much clearer guidance has been provided for IEQ8.3, Pre-occupancy Flush. In addition, the length of the flush has been reduced from one week to 48 hours, and the flush period may be non-consecutive.

IEQ10. Garage Pollutant Protection. The mandatory measure (IEQ10.1) has been restated to require that all air-handling equipment and ductwork be placed outside of the fire-rated envelope of the garage.

Gazing Into The Crystal Ball

Development of the LEED for Homes Rating System will continue, even after the formal nationwide program launch. Just as laws are inevitably amplified by case law, all of the LEED systems undergo continual refinement via the creation of credit rulings in response to credit interpretation requests (CIRs) and proposals for new innovation credits.

With the USGBC Board's 2007 decision to allow changes to LEED via ballot of individual credits—a break with the past, when only entire new rating system versions were balloted—we are also likely to see substantive changes introduced via this mechanism.

A number of enhancements that should be considered in the near term include credits for energy monitoring and reporting; universal design; improved acoustic performance, particularly near noisy roadways and in urban contexts; greater consideration of climate- and/or regionally-specific parameters; performance-based indoor water efficiency criteria; a sliding-scale mechanism addressing density, similar to the one for home size; and rewards for multi-family housing that recognize the resource efficiencies inherent in shared-surface structures.

Table 2

LEED For Homes Categories	Abbreviation
Innovation & Design Process	ID
Location & Linkages	LL
Sustainable Sites	SS
Water Efficiency	WE
Energy & Atmosphere	EA
Materials & Resources	MR
Indoor Environmental Quality	IEQ
Awareness & Education	AE

Table 3

Category	Minimum Score
Sustainable Sites	5
Water Efficiency	3
Materials & Resource	2
Indoor Environmental Quality	6

Finally, it is of paramount importance that USGBC—along with all other organizations that assess environmental performance—translate ratings into impacts. As public agencies, non-profits, and others increasingly look to green building programs as keys to meeting carbon reduction targets, carbon accounting will be at the top of their wish lists. UHD

The Author
Ann V. Edminster, M. Arch., LEED AP v2.0, has designed more than 100 remodels and spent the last decade as a green building consultant. She is a member and past co-chair of the LEED Materials & Resources Technical Advisory Group. She has worked with the USGBC's LEED Homes Committee since its inception and served as its chair and co-chair for the past four years. Ann resides in Pacifica, California, and can be reached at Design Avenues, 650 355 9150 or avedminster@earthlink.net.

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GREEN BUILD

2007 expo overview

David DelGrosso

Many people are unaware of the fact that Chicago is one of America's "greenest" cities. Not only was it one of the first cities to adopt the U.S. Green Building Council (USGBC) LEED® "green" building-rating system for public buildings, but it is also home to the largest number of LEED projects being built of any city worldwide. And last November, Chicago was also the host city for builders, manufacturers, consumers, and journalists, from all over the world, for what turned out to be the largest Greenbuild Conference and Expo ever!

The Conference Founders And Organizers

The U.S. Green Building Council is the nation's leading nonprofit organization composed of corporations, builders, universities, government agencies, and other nonprofit organizations working together to promote buildings that are environmentally responsible, profitable, and healthy places to live and work. Since its founding in 1993, the Council has grown to more than 12,000 member companies and organizations, a broad portfolio of LEED programs and services, the industry's popular Greenbuild International Conference and Expo, and a network of 72 local chapters, affiliates, and organizing groups. The Council's vision is a sustainable-built environment within a generation.

Highlights of their recently upgraded Web site include a resource section designed to make LEED project credit templates more accessible, easier access to online reference guides and LEED reference documents, more resources for members and chapters, a USGBC store to purchase workshop materials and publications, and a more comprehensive listing of educational offerings and workshops. (For more information, visit www.usgbc.org.)

The Greenbuild International Conference & Expo

The USGBC's Greenbuild International Conference & Expo convenes the industry's largest gathering of representatives from all corners of the "green" building movement. Three days of extensive educational programming, workshops, a vast exhibition floor, and ample networking events provide unrivaled opportunities to learn about the latest innovations, exchange ideas, and develop new business relationships. Most recently, Greenbuild 2007 was held on November 7 to 9, 2007 in Chicago, at McCormick Place.

This year achieved new records for attendance, with 22,835 attendees and more than 850 exhibit booths. And while they were expecting an excellent turnout, this year's conference was jammed with even more interest than anticipated. There weren't enough seats, enough meals, enough printed programs, or enough staff. But even despite the longest and slowest registration lines ever, most attendees

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Indoor Advantage GOLD

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agreed that this was the most productive Greenbuild Conference ever! (Visit www.greenbuildexpo.org for more information, and to view this year's highlights right from your computer, go to www.greenbuild365.org.)

The USGBC Honors Green Building Leaders

One of the highlights of every year is when the USGBC honors the most influential "green building leaders" during its annual Leadership Awards celebration. The USGBC Leadership Awards recognize companies and individuals who signify vision, leadership, and commitment to the evolution of "green" building design and construction, and were announced to a large gathering at the Merchandise Mart during this 2007 Expo.

"The organizations and individuals represented at the awards truly embody the attributes expected of a 'green' building leader," said Rick Fedrizzi, President, CEO & Founding Chair, USGBC. "It is because of their passion and expertise that our mission of transforming the built environment within a generation has gained momentum."

The 2007 Leadership Awards recognize achievements in six categories including Community, Education, LEED, Organizational Excellence, Research, and Advocacy.

In the Community category, LEED faculty member Gail Linsey from Design Harmony received the award for her integral role in the development of the design charrettes for the LEED rating system as well as her innovative work on the North Carolina Triangle J High Performance Guidelines and the Green Building Advisor program. Her past projects include: the Greening of the White House and the Pentagon, The Sustainable Design Initiatives for the National Park Service, The International Green Building Challenge, and the Department of Defense's Sustainable Design Training Program. In the last few years, Gail has been assisting the U.S. Environmental Protection Agency with their ENERGY STAR® Program.

The Aldo Leopold Legacy Center was honored in the Education category. Based in Baraboo, Wisconsin, this LEED-Platinum building is the new headquarters and construction center for the Aldo Leopold Foundation. Award honorees include The Kubala Washatko Architects, Inc.; The Boldt Company Appleton, Wisconsin; Tom Boldt; and Theresa Lehman. The building is carbon-neutral, "zero net" energy in design and will produce over 110 percent of annual building energy needs. A major building component includes site-harvested wood originally planted during the land restoration efforts by the Leopold family in the 1930s and 1940s.

In the LEED category, Rob Harris, Chief of the Engineering Division of the Directorate of Public Works, Ft. Bragg, North Carolina, received the award for his aggressive program to adopt LEED-NC and LEED-EB in the military facilities of Fort Bragg, where a $3 billion construction program will be completed over the next five years. He is a powerful advocate and ambassador for green building for the federal government, particularly within the Department of Defense.

In the Organizational Excellence category, David Eisenberg and the Development Center for Appropriate Technology (DCAT) received the award in acknowledgment of DCAT's focus on building sustainability into the codes over the past dozen years. David Eisenberg has effectively communicated to mainstream industry the importance of integrating green design principles into municipal codes, and he has been tireless in his grassroots efforts to educate and work hands on with green builders, both in the U.S., and increasingly on an international level.

KieranTimberlake Associates was honored in the Research category for creativity in seamlessly integrating research into design. The firm commits substantial resources toward research, development, and innovation. Through research into new materials, processes, assemblies, and products, KieranTimberlake seeks ways to improve the art, quality, and craft of architecture.

In the Advocacy category Ashok Gupta, Director, Air & Energy Program, Natural Resources Defense Council (NRDC), received the award in recognition of his work on the New York State Green Building Tax Credit and the carbon neutral redevelopment of the World Trade Center site. Ashok was co-chair of the energy and environmental policy advisory committee for Governor Spitzer's transition and is NRDC's representative on Mayor Bloomberg's Sustainability Advisory Board and Energy Policy Task Force. He was the primary architect of the New York State Green Building Tax Credit, and he was instrumental in securing the system benefit charge in New York State, which has provided long-term funding for green buildings.

The Opening Plenary—Former President William Jefferson Clinton

Greenbuild 2007 officially kicked off with an inspiring update by USGBC President and CEO, Rick Fedrizzi, followed by some encouraging words by former President William Jefferson Clinton.

In front of a packed auditorium of 8,000 attendees, the former President emphasized that solving the climate problem is the biggest opportunity for economic and social mobilization since World War II.

He reminded us that the U.S. lost out on a significant opportunity when it chose to not sign the Kyoto Protocol while he was still in office. Our country simply wasn't ready, for we first had to convince ourselves and the world of the "inconvenient truth"—that the recent acceleration in climate changes is real and serious.

Former President William Jefferson Clinton And Rick Fedrizzi

Paul Hawken

Photos courtesy of Oscar Einzig Photography

Of course many people more clearly understand the big picture today, thanks to Al Gore.

He reminded us that the task before us is to prove to the world that a response to global warming is not a hardship. It's the greatest opportunity for economic and social mobilization since World War II, and it is critical that Greenbuild attendees continue to prove it. For without further proof, China and other resisting nations will not join the effort.

He cited the example in Denmark, where the economy and wages are rising while energy consumption stays level. And in the United Kingdom, where Gordon Brown has reported massive job creation attributed to their people—active efforts to control carbon emissions—while the U.S. struggles to replace lost jobs with even lower-wage jobs.

He proclaimed that America is in the solutions business, not the complaining business—that when you give Americans a challenge, we're as good as anyone else at getting it done. And we must now convince everyone that stopping climate change represents a staggering economic opportunity.

Former President Clinton also announced a major partnership to help retrofit public and private schools across America.

The USGBC, the Clinton Climate Initiative, GE Real Estate, and the American College and University Presidents Climate Commitment (ACUPCC) have joined together to create a Green Schools Retrofit Program to retrofit U.S. schools and universities. And he emphasized that there are currently more "green" prisons than schools, and that our children certainly deserve at least as much support as these inmates.

Thursday's Plenary—Paul Hawken

"If cities are our civilization, then when we build buildings that kill, we are not civilized," stated Paul Hawken.

Paul Hawken has spent over a decade researching the worldwide movement of organizations dedicated to restoring the environment and fostering social justice. His recent best seller, *Blessed Unrest*, explores the diversity of this movement —its brilliant ideas, innovative strategies, and hidden history.

A culmination of Hawken's many years of leadership in the environmental and social justice fields, it has inspired and delighted many who despair of the world's fate, and its conclusions have surprised even those within the movement. Fundamentally, it is a description of humanity's collective genius, and the unstoppable movement to re-imagine our relationship to the environment and one another.

In his plenary speech, Hawken passionately re-delivered these messages to an enthusiastic Greenbuild audience.

He reminded us that the "green" movement is like no other movement in history—because what we're facing is not purely economical, political, or social. And we now have the power to eradicate the ills of the world, by placing the "e" back onto the end of "human."

This movement has no single leader or unifying message. It is made up of compassionate environmental and socially conscious organizations with a shared vision of a better world. And he concurred with Mr. Clinton's vision that we have an opportunity to redesign, re-create, and redevelop our future—and the time is now!

Top-10 Green Building Products

BuildingGreen, Inc., publisher of the *GreenSpec® Directory* and *Environmental Building News*™, announced the 2007 Top-10 Green Building Products. This sixth annual award, announced at the U.S. Green Building Council's Greenbuild Conference, recognizes the most exciting products drawn from additions to the *GreenSpec Directory* and coverage in Environmental Building News.

Collins Pine FreeForm

"Our selections of the Top-10 Green Building Products represent a wide range of product types in many different application areas," noted GreenSpec co-editor and BuildingGreen president Alex Wilson. Four of BuildingGreen's winning products this year save energy. Two products save water. Three products are green in part because they are made from recycled or recovered material; two because they avoid hazardous manufacturing or disposal of materials, and one aids in the siting of solar energy systems. "Most of the Top-10 products this year have multiple environmental attributes," said Wilson.

BuildingGreen's Top-10 Product selections, as in previous years, are drawn from new additions to the company's GreenSpec product directory. More than 200 product listings have been added to the GreenSpec database during the past year. "New products seem to be appearing all the time, making it a challenge for our staff to keep up," said Wilson. The GreenSpec database the company maintains now includes more than 2,000 product listings.

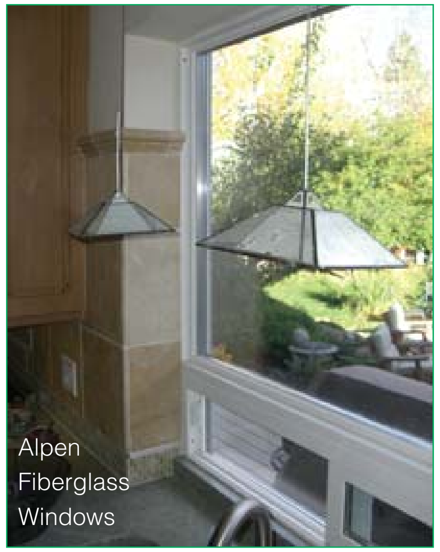
A big driver in the development of green products continues to be the U.S. Green Building Council's LEED Rating System (Leadership in Energy and Environmental Design), which awards points for the use of certain product types or for the energy or water savings that "green" products can achieve. "Designers of LEED buildings are looking for 'green' products, and manufacturers are responding," said Wilson. In the online version of GreenSpec, users can find products organized by LEED credits.

The 2007 Top-10 Green Building Products are as follows:

Collins Pine FreeForm From The Collins Companies

FreeForm is a new FSC-certified particleboard manufactured by The Collins Companies that is produced with no added urea-formaldehyde. A melamine-formaldehyde binder is used rather than industry-standard urea-formaldehyde. Initial chamber testing has shown formaldehyde emissions to be in the range of 0.09 to 0.13 parts per million, which meets the recently announced Phase I California Air Resources Board (CARB) standards for formaldehyde emissions, but not the Phase II standards. Within a year, the company anticipates that FreeForm will meet Phase II standards, and it hopes to eventually eliminate formaldehyde-based binders altogether.

All FreeForm particleboard carries the Forest Stewardship Council label, designating products sourced from third-party-certified, well-managed forests. In contrast, with many other FSC products, the certification is an option available only at an upcharge. While low-formaldehyde particleboard made with phenolic binders is darker than conventional UF-particleboard (due to the reddish color of phenol-formaldehyde), FreeForm is lighter in color, because melamine binder is white.


Alpen Fiberglass Windows

Alpen Fiberglass Windows From Alpen Energy Group

A longtime innovator in the window industry, Alpen Energy Group sets the bar for energy performance with its high-performance fiberglass windows. Alpen uses a combination of suspended low-emissivity (low-e) Heat Mirror films, low-e coatings on glass, low-iron glass to increase visible light transmittance, low-conductivity gas fill (including krypton and xenon), pultruded fiberglass frames insulated in vacuum silica aerogel packets, and low-conductivity glazing spacers to provide 1-3/8-inch-thick Alpenglass windows with a wide range of properties to meet different needs.

Their highest performing windows, which were installed on north-facing walls at the Rocky Mountain Institute in 2007 and will be installed at an Antarctic research station in 2008, have three suspended films (each with low-e coatings on both sides), and provide R-20 center-of-glass insulating value (unit R-value of 10, U-factor 0.10). The majority of the company's products are used in projects in which different glazings are used for different wall orientations. Alpen provides windows for both commercial and residential applications.

180 Walls

180 Walls From Milliken & Company

180 Walls from Milliken is a highly permeable, woven wall covering for commercial applications, made from 100 percent pre-consumer recycled polyester. It has a self-adhesive backing that eliminates the need for paste. This product has achieved a Silver rating in McDonough Braungart Design Chemistry's Cradle-to-Cradle certification program, and is certified to meet the Greenguard Children and Schools standard. (It was the first Greenguard-certified wall covering to be tested with its adhesive.) And 180 Walls is less expensive than most fabric wall coverings.

Evolution 800 Series SHE98M Dishwasher From Bosch

The top-of-the-line 800 Series SHE98M line of Evolution Dishwashers from Bosch are the most energy-efficient and quietest full-size dishwashers available in America. The SHE98M model is rated at just 190 kWh per year of electricity consumption, has an Energy Factor of 1.14, and a noise level of 42 dBA.

Evolution 800 Series SHE98M Dishwasher

This dishwasher sets the standard for green performance today. The Energy Factor of this dishwasher is 148 percent higher than the federal standard in the U.S. and 73 percent higher than the ENERGY STAR requirement—and is also available in the Integra line as the SMX98M model. As a company, Bosch has made a strong commitment to the environment and is the only appliance manufacturer with 100 percent of applicable products currently meeting ENERGY STAR standards.

Greenplay Children's Furniture From Skyline Design

Skyline Design's Greenplay furnishings for children's environments include tables, seating, shelving, and play spaces. Products are made with environmentally responsible and healthy materials and finishes, including post-consumer recycled plastic, sunflower hulls, and FSC-certified wood. All paints and coatings are zero- or very low-VOC; adhesives are entirely avoided in favor of mechanical attachments, improving end-of-life recyclability. Skyline Design also has a take-back policy in which it will accept outgrown Greenplay components to repurpose and donate.

Greenplay Children's Furniture

Cube3 Ultra Urinal From Caroma

Caroma's new Cube3 Ultra urinal is an advanced, ultra-low-flush urinal that flushes using just one pint (0.5 liters) of water. The product features a bowl that is optimized for very low water use and a liquid-sensing (as opposed to motion-sensing) automatic flush mechanism that prevents false flushes. The high-gloss vitreous china surface minimizes staining and improves sanitation and cleaning. With mixed success of waterless urinals in the field and lingering resistance by building officials, ultra-low-flush urinals (using 1 quart, 1 liter, or less) provide an attractive alternative.

LifeGuard Low Smoke Zero Halogen Cable From Houston Wire & Cable Company

Nearly all electrical cable today is insulated and sheathed with PVC or other halogenated plastics, such as

Teflon (a fluoro-polymer). Many cable products also contain lead and other heavy metals, as well as phthalate plasticizers (which are likely endocrine disruptors).

LifeGuard is a line of low-smoke, near-zero-halogen electrical cables (some may contain trace amounts), many of which are lead-free and RoHS compliant (for the European Reduction of Hazardous Substances accord). Houston Wire & Cable Company sells LifeGuard primarily for high-reliability needs in utility and industry applications. The cable has also been used in highly populated commercial applications such as hospitals, transportation corridors, and universities where toxic smoke from halogenated cable is of particular concern. Products are available that are appropriate for commercial and residential applications, though, to date, high cost has discouraged use for residential wiring.

Greenplay Children's Furniture

LifeGuard Low Smoke Zero Halogen Cable

EnOcean Wireless Controls

Wireless Controls From EnOcean

EnOcean produces a variety of energy-harvesting wireless controls for lighting and other building-automation equipment. Developed by German engineering giant Siemens and spun off as a separate company, EnOcean has engineered radio-frequency communication to use just one-tenth the power of most such controllers, and figured out how to power these devices by harvesting ambient energy—including mechanical energy from operating a light switch or photovoltaic energy from lighting in a room. This enables the controllers to operate without batteries, thus saving the materials, energy, and waste from battery manufacturing and disposal. Because wiring is not required, advanced controls may be more widely used, thus resulting in significant building energy savings.

SunEye From Solmetric Corporation

The Solmetric SunEye is a hand-held electronic device for measuring solar shading and calculating solar access for solar installers and green builders. It has an integrated fish-eye lens and digital camera that captures an image of the site. Integrated electronics plot solar exposure at that location. Users can edit images, simulating the removal of obstructions such as trees or structures. Shading percentages in monthly, seasonal, annual, and multi-skyline averages can be determined in the field or uploaded to a personal computer via USB data cable for further analysis, reporting, and printing. The Solmetric SunEye automatically generates reports for sales quotes and solar rebate applications.

LED Downlight From LED Lighting Fixtures, Inc.

Incandescent lighting is highly inefficient, converting about 90 percent of the electrical energy into heat, rather than light. Fluorescent lamps, including compact fluorescent lamps (CFLs), are three to four times as energy efficient as incandescent light sources and last up to ten times as long, but they require mercury, a toxic heavy metal. LED (light-emitting diode) lighting

Solmetric SunEye

LED Downlight

requires no mercury, and LED light sources have extremely long lifetimes—up to 50,000 hours, or three to five times that of fluorescent lamps.

Until recently, LEDs did not approach fluorescent lamps in efficacy—the light output in lumens per watt of electricity consumption—and the light quality was not nearly as good as incandescent lamps. Now LED Lighting Fixtures, Inc. (LLF) has introduced an LED downlight, the LR6, which uses just under 11 watts to provide 650 lumens of light, for a measured efficacy of 60 lumens per watt, which is better than CFL downlights. Just as significantly, the lamp has a color rendering index (CRI) of 92, which is significantly better than most CFLs. LLF achieves this performance by using a proprietary mix of red and yellowish-green LEDs—42 per fixture—behind a diffuser to provide a natural-looking, warm-white light.

By contrast, most "white" LEDs achieve the white light by coating blue LEDs with a yellow phosphor, which results in a cool-blue rendering. The LLF LR6 was the grand prizewinner in the Solid State Lighting category in the 2007 Lighting for Tomorrow competition, sponsored by the U.S. Department of Energy and others. The product is designed to fit into standard 6" recessed cans and is available with Edison screw-base and the newer GU-24 mount.

Greenbuild 2008 Moves To Boston

For 2008, the U.S. Green Building Council's Greenbuild International Conference and Expo will be held in Boston, from November 19 to 21. The historic cradle of the American Revolution, and home to innovations that have far-reaching impact, makes Boston the perfect place to celebrate Greenbuild 2008's theme of "Revolutionary Green: Innovations for Global Sustainability."

And all of us at *Ultimate Home Design* magazine are very excited about this event. For the first time, we will be staging a full-on presentation at Greenbuild 2008, to reveal the step-by-step process for creating our first Optimum Performance Home®—expected to be the highest rated LEED for Homes Platinum residential home in the world!

"The future belongs to those who give the next generation reason to hope."—Teilhard de Chardin **UHD**

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A Breath Of Fresh Air: the GREENGUARD certification program

Henning Bloech

synopsis

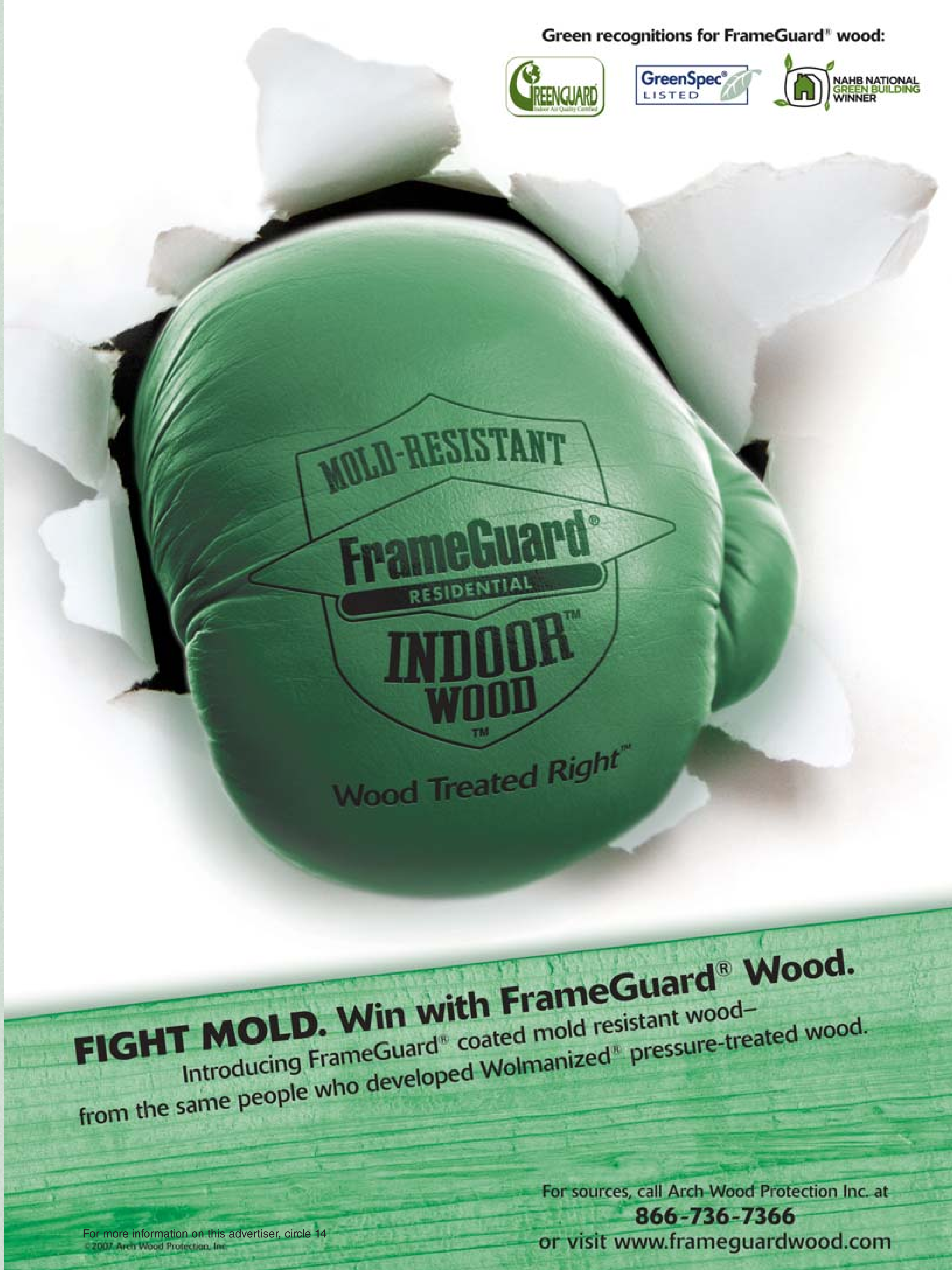
- One of the primary control measures for achieving acceptable indoor air quality is source control: reducing potentially harmful emissions at the source through low-emitting indoor products and materials.
- Virtually every product and material used in buildings release chemicals called Volatile Organic Compounds (VOCs) into the indoor air, many of which are harmful to human health.
- The GREENGUARD Certification Program was founded to establish a true third-party certification based on proven emissions standards and giving specifying and procurement professionals a resource for low-emitting products.
- The GREENGUARD Indoor Air Quality Standards require that each and every individual chemical emitting from a product is identified and compared to the Threshold Limit Value (TLV) Industrial Workplace Standard, a health-based standard set by the American Conference of Government Industrial Hygienists.

Ensure Acceptable Indoor Air Quality

The majority of health and environmental organizations around the globe recognize indoor air pollution as a significant threat to public health. Poor indoor air quality can lead to allergies, asthma, reproductive and developmental problems, and cancer. As stated by the U.S. Environmental Protection Agency (USEPA) in its vision for the 21st Century: "Risk reduction must be accomplished through better building design, construction, and operation; improvements in the development and use of indoor products; or mitigation of existing exposures within a building or its immediate vicinity." Virtually every product and material used in buildings releases chemicals called Volatile Organic Compounds (VOCs) into the indoor air, many of which are harmful to human health. While it is widely known that paint releases high amounts of VOCs during its application and drying process, it is little known that products such as furniture, insulation, or flooring systems can be significant sources of pollutants to the indoor environment over much longer periods of time. The challenge to building professionals is to choose and specify products and materials that have minimal impact on indoor air quality without neglecting all other demands and requirements that must be addressed.

One of the primary control measures for achieving acceptable indoor air quality is source control: reducing potentially harmful emissions at the source through low-emitting indoor products and materials.

In the past, the only way to obtain information about low-emitting products and materials was to ask the manufacturers. Unfortunately, the lack of product definition and uniform



testing and performance requirements have left many marketing claims confusing and unsubstantiated. To date there are no federal, state, or local regulations that control a product's emissions of VOCs. Some states and federal agencies, such as the State of Washington or the U.S. Environmental Protection Agency (EPA), set purchasing requirements for their own facilities but shy away from universally applicable indoor air quality standards. The carpet industry was required to establish an indoor air-quality-labeling program in the early 1990s as a result of the Carpet Policy Dialogue. The program, which is administered by the industry's trade association, was successful in controlling and reducing VOC emissions from carpet and associated material. However, the program does not have established third-party oversight or performance verification procedures.

In the past few years, a multitude of "green" building initiatives have emerged that focus attention on indoor air quality among other environmental building aspects. The U.S. Green Building Council (USGBC) recognized indoor air quality as a major part of "green" building in their Leadership for Energy and Environmental Design (LEED®) program. Indoor air quality accounts for 23 percent of all credits in LEED, but more work is needed as current scorings are based heavily on chemical content and not actual tested or verified chemical emissions.

Many credits focus on components and content of products and materials rather than on their actual emissions. Therefore, the effect on building occupants and indoor environments remains unaddressed. Unfortunately, most other "green" building programs, such as the Green Guide for Healthcare, the National Association for Home Builders (NAHB) Green Building Guidelines, the Green Globes program, as well as local initiatives like Earth Craft House in Atlanta or BuiltGreen in Denver and Seattle, also focus their indoor air quality portions on content-based criteria. While formaldehyde-free, low-VOC, or VOC-free materials may have an environmental benefit, they give no indication of the material's indoor air quality performance. Today, none of the existing "green" building programs can ensure acceptable indoor air quality.

The GREENGUARD Certification Program was founded to fill the void, establishing a true third-party certification based on proven emissions standards and giving specifying and procurement professionals a resource for low-emitting products. However, the many consumer and user questions related to manufacturing claims and verification of emissions performance led to the conclusions that it was not enough simply to test products one time and publish low-emissions results. A true third-party, non-profit organization was needed to establish procedures, protocols, and verification processes, independent from industry or monetary interests.

The GREENGUARD Environmental Institute

In June of 2001, the GREENGUARD Environmental Institute (GEI) was founded to oversee the GREENGUARD Certification and labeling program. The GEI is an industry-independent, non-profit organization founded to establish indoor air quality standards for buildings, products, and building materials. Its goal is to improve public health and quality of life by encouraging and helping manufacturers to build better, safer products and to provide the public with a free indoor air quality resource and guide to low-emitting products. The GREENGUARD Certification Program for interior products and building materials is the leading testing program worldwide for low-emitting products. The GEI oversees the certification process, including all audits and qualifying criteria for each product category. The members on its Certification Advisory Board are world renowned for their expertise in "green" design, indoor air quality, chemical emissions testing, and public health. The GREENGUARD Certification Program is an indoor air quality resource guide, identifying specific products, which are regularly tested to ensure that their chemical and particle emissions meet acceptable indoor air quality pollutant guidelines and standards. This certification program is a valuable tool for builders, architects, designers, product specifiers, and consumers who want to locate, specify, and purchase low-emitting products for indoor environments. GREENGUARD Certification is a voluntary program available to all manufacturers and their suppliers.

> "In the past few years, a multitude of 'green' building initiatives have emerged that focus attention on indoor air quality, among other environmental building aspects."

The GREENGUARD Certification Program includes all construction materials, furnishings, furniture, office equipment, cleaning and maintenance materials, and processes that are used in interior environments. General product categories include: office furniture, insulations, wall coverings, textiles, flooring, architectural paints and coatings, general construction materials, adhesives and sealants, appliances, ceiling systems, office equipment, consumer products, and carpet-cleaning systems. General categories have subgroups, which

are typical of procurement groupings. For example, office furniture has subgroups of workstations, acoustical panels, desks, tables, file and storage cabinets, bookcases, and chairs. New product categories will be added as the program expands.

Following its mission of protecting the health of building occupants, the GREENGUARD Environmental Institute recently created a new standard and product certification for low-emitting products and materials for use in day-care and school facilities. The tough new GREENGUARD Certification for Children & Schools is an extension to the established GREENGUARD Indoor Air Quality Certification Program to more effectively protect children from exposure to high levels of potentially harmful chemicals.

Performance-Based Standards

The GEI has established performance-based standards to define goods with low chemical and particle emissions for use indoors. The standards are based on established certification procedures, including test methods, allowable emissions levels, product sample collection and handling, testing type and frequency, and program application processes and acceptance. All products are tested in dynamic environmental chambers following American Society of Testing Materials (ASTM) standards D-5116-97 and D- 6670-01, the USEPA's testing protocol for furniture, and the State of Washington's protocol for interior furnishings and construction materials. Products are measured for emission levels, which must meet the established indoor air concentrations within one week of installation within a building. Maximum allowable emission levels are based on those required by the state of Washington's indoor air quality program for new construction, the USEPA's procurement specifications, the recommendations from the World Health Organization, California's specification 01350, and Germany's Blue Angel Program. Where these groups' standards differ, GREENGUARD uses the most stringent requirement for a particular pollutant.

Environmental chamber testing can be costly because it is very capital intensive and is a cutting-edge technology. Worldwide, very few facilities are advanced enough to measure chemical levels as low as those specified in the GREENGUARD Standards. Even fewer have the quality management programs in place to continuously produce scientifically valid and reproducible data. The GEI has taken those challenges into account, designing a certification program to minimize the financial impact on the manufacturers without compromising program quality. GREENGUARD Certification looks at a limited number of carefully selected and researched products representing a whole product line, utilizing worst-case scenario and economies of scale to minimize testing efforts and still be able to determine the indoor air quality performance of each and every certified product.

The testing laboratory performs sample profile testing and on-site manufacturing reviews to gain in-depth knowledge of the manufacturer's production processes, and how such processes impact chemical emissions and variability among manufactured products. They then determine the number of certification-testing categories for the products and the scope of testing needed. The profile testing and manufacturing review include visits to manufacturing facilities and environmental chamber testing of product samples from each facility to aid the laboratory in the preparation of a certification test plan for the products.

Once certification test categories have been established, the lab performs initial certification testing, which includes emissions testing of the products in each certification category to determine whether they comply with the GREENGUARD emission levels. Certification testing also includes quarterly confirmation testing and annual recertification testing of products representing each certification category to monitor ongoing compliance with GREENGUARD emission standards.

If the product meets the emissions levels and the application is complete, the manufacturer may use the GREENGUARD Indoor Air Quality Certified™ mark on the certified product, its packaging, and its marketing material. If the product does not meet the emissions level for either an annual or quarterly test, the laboratory will conduct a retest of the same product. If the results are confirmed, the manufacturer will be requested to identify the cause of the product test failure in writing and to submit a correction action plan and corrected certification sample. A consecutive retest failure will result in loss of certification.

GREENGUARD Indoor Air Quality Standards

The GREENGUARD Indoor Air Quality Standards require that each and every individual chemical emitting from a product is identified and compared to the Threshold Limit Value (TLV) Industrial Workplace Standard, a health-based standard set by the American Conference of Government Industrial Hygienists. Under the GREENGUARD criteria, any pollutant, not specified otherwise, must meet an air concentration level less than 1/10th (less than 1/100th for Children & Schools Certification) of the levels established by the TLV standard. This provides a significant safety margin over current workplace standards. GREENGUARD requires the use of a library of over 75,000 different chemicals to identify and analyze each individual VOC emitted from a product. A complete listing of all identified chemicals emitting from a product is provided to the manufacturer. All measured chemicals that are identified as carcinogens or reproductive toxins according to

California Prop. 65, the U.S. National Toxicology Program (NTP), and the International Agency on Research on Cancer (IARC) are reported. Customers of GREENGUARD Certified Products can rest assured that every chemical emitting from the product they purchased has been detected, identified, and found to be within 1/10th of the TLV standard.

Product emission testing is useful, because the test results can be translated into real-world scenarios. The most reliable and scientifically proven way to provide this information is through environmental chamber testing. The testing chambers are dynamic, which means that purified air streams into the chamber and samples are collected from the exhaust air. This dynamic process resembles the airflow patterns in rooms and buildings and provides data, which can be easily translated into real-world scenarios. Environmental chamber testing provides a controlled and representative indoor environment that allows the product to produce the emissions in a realistic manner similar to the way the product would emit in a building. Environmental chamber testing allows the wide spectrum of VOC emissions to be determined rather than just the primary components of the product. Many times, the primary components of a product are not the primary sources of volatile emissions from a product. Frequently, the reaction by-products of the primary components or contaminants in those components comprise the majority of the volatile emissions from a product. Environmental chamber-testing emissions data can be mathematically modeled to determine exposure concentrations produced by the use of the product in many different indoor environments. Modeling of a product's emission data allows the product use to be evaluated for health, irritation, and odor concerns for a wide range of indoor environments. The product is tested at the same loading ratio of exposed surface area to room volume, as found in a typical indoor environment. This way, the results of chamber testing are scalable to any size room.

GREENGUARD Benefits To The Public

The benefits of a program such as GREENGUARD to the public are many. The GREENGUARD Indoor Air Quality Certified seal provides an easy way for homeowners, building managers, and construction, design, and procurement professionals to identify low-emitting products and materials for their homes and building projects without incurring any extra effort or cost. Additionally, the GEI helps promote awareness of indoor air quality issues and good indoor air quality management through presentations, white papers, articles, and other general education mechanisms.

Just a few years ago, it was a major undertaking to find low-emitting products and materials. Not only did it take a lot of extra time and effort to research the products and necessary requirements, it also increased the costs of the project because very few low-emitting products were readily available. Fortunately, we have come a long way since then. Today, it has never been easier to find and specify third-party-certified, low-emitting products and materials. Many manufacturers have stepped up to the plate and tested, improved, and certified their standard products to meet indoor air quality criteria. Online resources, such as www.epa.gov/iaq, www.greenguard.org, and www.aerias.org provide access to comprehensive information on indoor air quality, indoor air quality management plans, a guide to certified low-emitting products, and specification templates at no charge. Greenguard.org alone features over 3,500 indoor air quality certified interior brand name products in their product guide.

People have a right to good indoor air quality, and it is fundamental to every building. Today, good indoor air quality can be achieved without compromising individual design preferences and at virtually no additional cost or effort. UHD

The Author

Henning Bloech is the Director of Communications for the GREENGUARD Environmental Institute, a non-profit organization that oversees the GREENGUARD Certification Program, the independent testing program for low-emitting products and materials. The Institute's goal is to improve public health and quality of life by creating better indoor environments and helping manufacturers build better and safer products. Mr. Bloech helped establish and grow the GREENGUARD Certification Program and has published numerous articles and presentations on indoor air quality and "green" design. Mr. Bloech can be reached via e-mail at hbloech@greenguard.com.

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Ingredients For Sustainable Living

Recycled Toilets, Tubs, And Sinks

A breeze to maintain—simple soap and water cleanup, durable, eco-friendly, and beautiful—choose EnviroMODE for your next countertop or flooring project.

Thinking outside the box is something EnviroGLAS® founder Tim Whaley does well. Nicknamed "Scrappy" by the Dallas Business Journal, the Texas entrepreneur was granted a U.S. patent in 2003 for developing the "method of making a terrazzo surface from recycled glass." The idea for combining the multi-colored crystals with epoxy resin to create recycled glass terrazzo came to him after he saw a news story in July 2002 about Plano, Texas's overabundance of crushed recycled glass. Four years and several awards later (including the 2006 Outstanding Market Development Award for EnviroMODE™, Builder News Best 20 Products for 2006 and the Texas Environmental Excellence Award for small business in 2005) Whaley is at it again. This time it was the City of Dallas who asked him if he could do anything with a bunch of old toilets and commodes. The juices started flowing and soon EnviroMODE was born.

This brand new terrazzo surface is made from recycled tubs, sinks, and toilets. It's easy to maintain, durable, eco-friendly, and beautiful. Available in hundreds of resin colors, the bone-colored porcelain looks fantastic in neutral and earth-toned resins, and really pops in bold resin colors like black, yellow, blue, and red.

"I am always looking for companies that are creating new and innovative products from recycled materials," said Dallas Recycling Manager Sherlyn McAnally. "The crushed porcelain has a beautiful pearl-like finish and can be used in a versatile array of applications."

EnviroGLAS offers EnviroMODE terrazzo as well as their recycled glass terrazzo finishes in a countertop product called EnviroSLAB™ and in rectangular tiles called EnviroPLANK™ for flooring, walls, and other creative uses. Both the recycled glass and porcelain can also be used as aggregate in traditional poured-in-place terrazzo flooring. What's more, the two types of aggregate can be mixed together for a more complex design.

The first installation of EnviroMODE was in a Chicago area home basement. The renovation aired on an HGTV program called "New Spaces" in June of 2007. The basement remodel created a warm, welcoming, and environmentally friendly family media room with an adjacent bathroom where EnviroMODE was the focal point. "This material is a very ingenious product and a great way to 'close the loop' in recycling," said project designer Karen Kaplan. "And it's great looking as well." With the increasing demand of environmentally friendly products, EnviroGLAS is at the forefront of the booming Green initiative. EnviroGLAS products are made up of 75 percent recycled glass and/or porcelain, and 25 percent epoxy resin binder with no Volatile Organic Compounds (VOCs) and negligible emissions. This allows for quicker move ins with no indoor air quality issues. Plus, EnviroGLAS contributes to seven or more U.S. Green Building Council LEED® (Leadership In Energy & Environmental Design) points. And it conserves natural resources by utilizing reclaimed glass and porcelain instead of marble or granite mined from the earth, thus ensuring lower greenhouse emissions since the glass and porcelain are used and transported from local recycling programs. UHD

Building The Healthy Home

Concept, Design, Materials

Linda Mason Hunter
Senior Editor, The Healthy House Institute™

synopsis

- The air inside our houses is often many times worse than the air outdoors—at times, two to five times worse, according to the U.S. Environmental Protection Agency (EPA).
- By the 1970s, "sick building syndrome" entered the lexicon, followed by a radical increase in allergies and asthma, and an upsurge in cases of chemical hypersensitivity.
- The Healthy House Institute embraces the overall concept of physical and psychological well-being, regardless of sensitivity and treats the home like an ecosystem with many interrelated parts, covering topics in depth such as air and water quality, building, remodeling and furnishing, cleaning and housekeeping, health and safety, ventilation, lighting, energy efficiency, and more.

When it comes to housing, America took a wrong turn somewhere after World War II. Little by little, we have since filled our dwellings with synthetic chemicals. They enter our houses disguised as cleaners, paints, building materials, and furnishings, even cosmetics, grooming aids, and cookware. At the same time we have tightened up for energy efficiency, thus reducing the amount of fresh air coming in. As a result, for the first time in history, the air inside our houses is often many times worse than the air outdoors—at times, two to five times worse, according to the U.S. Environmental Protection Agency (EPA).

This polluted air is making people sick. By the 1970s, "sick building syndrome" entered the lexicon, followed by a radical increase in allergies and asthma, and an upsurge in cases of chemical hypersensitivity. Today, more than 15 percent of the U.S. population suffers from Multiple Chemical Sensitivity (MCS)—and those are diagnosed cases. Many more complain of adverse physical symptoms (from lethargy and fatigue; to headaches, dizziness, and nausea; to a range of respiratory troubles and general malaise) apparently due to indoor air pollution—a result of poor design, bad ventilation, and a plethora of unhealthy chemicals. One theory about hypersensitivity is that irritating chemicals are harmful to everyone—but most people never know it.

Fortunately, the Healthy House Institute (HHI) provides in-depth information on how to help remedy the problem. It's part of a revolution occurring in building design and construction. "In order to live healthfully, in order to live happily, we need to make educated choices," insists Allen Rathey, Idaho businessman and HHI's president. "We need to evaluate our actions. Develop options. The Healthy House Institute helps people do that."

What Does Healthy Building Cost?

How much does it cost to build or renovate with healthy materials? If you choose wisely, it should cost no more than one percent of standard construction costs, according to Adam Prince, Business Development Manager with Independence Energy Homes in Charlestown, Massachusetts. Some non-toxic materials cost the same as conventional brands, such as substituting exterior-grade plywood for interior grade. Others cost more initially but are more economical in the long run, such as installing radiant in-floor heat instead of a forced air system, or using high-quality insulated windows. Many states offer tax credits and rebates, which help lower costs, so be sure to check.

The Healthy House Institute

It's often a short road from good health to chemical sensitivity. It seems many people become hypersensitive to some degree after moving into a recently built house or shortly after completing a remodeling project. That's what happened to Lynn Bower. After she and her husband John renovated their Indiana farmhouse using traditional methods, materials, and finishes, she became seriously ill. Fortunately, her story has a happy ending. The event propelled the couple to research the subject, leading John to write *The Healthy House: How To Buy One, How To Build One, How To Cure A Sick One*, which has become a classic in the field of home ecology. In 1992, the Bowers founded the Healthy House Institute, published four more books and six videos, and became regular speakers at conventions and respected sources for consumers, the media, and building tradespeople.

Recently, the Bowers sold their domain name, books, research, articles, and videos to Rathey, who is transforming the Institute into an online library with a mission to become the leading book and online publisher of healthy home topics. Online in early 2007, the site treats the home like an ecosystem with many interrelated parts, covering topics in depth such as air and water quality, building, remodeling and furnishing, cleaning and housekeeping, health and safety, ventilation, lighting, energy efficiency, and more.

While the Bower's approach to healthy housing comes from a point of chemical sensitivity, the new Healthy House Institute embraces the overall concept of physical and psychological well-being, regardless of sensitivity.

Basic Concepts

Whether remodeling or building from scratch, the three most important principles of healthy construction are eliminate, separate, and ventilate. These principles are represented by the three vertical bars in the Healthy House Institute logo.

ELIMINATE

When selecting construction and furnishing materials, elimination is by far the most important principle. Eliminating toxins in the first place leaves fewer harmful pollutants to contend with. Some of the worst offenders are manufactured wood products, paints, adhesives, vinyl, and foam cushions/mattresses. Unfortunately, these potentially polluting components are standard in most houses.

SEPARATE

If a source cannot be eliminated, then it's important to separate it from the living space. For example, insulation can often be effectively sealed from the living space by using foil-backed drywall. In older houses with asbestos-wrapped pipes, if the asbestos is in good shape, simply wrapping the pipe with low out-gassing polyethylene plastic will help contain the material. If out-gassing from the plastic jacketing of electrical wiring is offensive to sensitive persons, it can be placed inside a metal conduit.

VENTILATE, VENTILATE, VENTILATE

Because human beings need fresh air, houses should receive .35 air-changes-per-hour, according to the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE). Of course, that rate of ventilation may need to be adjusted based on indoor conditions. Houses built before 1965 may be able to rely on infiltration and natural ventilation (such as opening windows) for these air changes, but

The Difference Between "Green" And "Healthy"

Though these words are now often used interchangeably, traditionally there has been a difference between "green" and "healthy." "Green" building focused on resource conservation, energy efficiency, and reducing consumption. Healthy design promoted pollution-free air and water, and products that are safe, less toxic, or harmful to human health.

The distinction can be important because there are times when green is not necessarily healthy, and vice versa. An example of a "green" product that is not healthy would be a carpet pad made of recycled tires. While this is an excellent idea from the perspective of reducing tires in the landfill, it is not a healthy product to use inside a home because tires continue to off-gas during their lifetime. Examples of healthy design that is also green include proper placement of windows and doors for natural heating and cooling, and use of natural lighting.

> "In order to live healthfully, in order to live happily, we need to make educated choices."

newer houses built with insulated windows and sheet goods (like drywall and plywood) leave fewer cracks for fresh air to enter.

That's where mechanical ventilation enters the picture. The tighter the house, the more important this is. Mechanical ventilation can be controlled and fitted with filters (e.g., high-efficiency, HEPA, or carbon absorber) to provide a steady supply of clean fresh air. In many areas of the country, mechanical ventilation is a code requirement in new construction, and costs anywhere from $500 to $2,000 without ductwork, according to Independence Energy Homes' Adam Prince.

Most houses need localized ventilation, as well, used intermittently to reduce humidity in kitchens and baths, and to reduce pollutants from occupant-related activities, such as smoking, applying pesticides, and working in laboratories and shops. Exhaust fans are the method of choice in these cases; taking care the house doesn't become depressurized.

Overall, a three-pronged approach is best—build a tight structure, use low-toxic materials, and a modest amount of ventilation to meet occupant needs. By trying to rely exclusively on ventilation to deal with indoor pollution problems, you'll probably need a more powerful mechanical system—one more costly to install, more expensive to operate, and probably noisier, not to mention a bigger heating and cooling budget, than if you used the principles of eliminate and separate first.

Do's And Don'ts Of Healthy Design

What is healthy house design? In a nutshell, healthy houses promote good health for those who live in them, use construction materials and techniques with low environmental impact, and work in harmony with nature by making use of sun, wind, vegetation, and water to reduce energy consumption and pollution.

Once you understand the basic concepts, constructing a house that will not make occupants sick is no more difficult than "unhealthy" house construction. It involves selecting low-toxic materials, but also requires a basic understanding of how a house functions. Follow these dos and don'ts.

1. Build in a clean locale.

If outdoor air is poor, indoor air quality will also be poor. Likewise, if there are many ground pollutants—pesticides, dust, etc.—these get tracked into the house. For that reason, a mudroom or foyer is always a good idea in a healthy house.

2. Build an airtight structure.

An airtight envelope minimizes the amount of uncontrolled infiltration, improves energy efficiency, and (when coupled with a mechanical ventilation system) offers maximum control over indoor air quality.

3. Install a radon removal system.

Test for radon after the house is built. It's also much easier (and less costly) to take basic precautions before construction that may or may not be employed later (such as pre-installing pipes for sub-slab ventilation of radon), than to mitigate radon afterwards if precautions weren't taken.

4. Respect the laws of building science.

Moisture migration, wind and stack effect-induced pressure, mechanically induced depressurization, and out-gassing all follow well-defined physical laws. If these laws are properly understood and acted upon, healthy durable houses are the result.

5. Pay attention to depressurization.

If conventional combustion appliances are used, make sure back drafting and spillage of combustion gases will not occur. Better yet, specify sealed combustion appliances, solar and/or geothermal heat, electric or heat pump furnaces, and water heaters.

6. Install a mechanical ventilation system.

Mechanical ventilation can supply fresh air at the correct rate whenever it is required. There are several approaches, including supply ventilation through a fresh air duct to the return air-side of a furnace, central exhaust, and heat-recovery ventilation.

7. Avoid products containing formaldehyde.

This includes composite wood products, such as medium-density fiberboard (MDF) and interior-grade plywood, often found in cabinetry and sheet goods. Composite wood contains urea-formaldehyde binders known to out-gas into the air for months. Formaldehyde is a known carcinogen.

8. Use water-based adhesives, caulks, paints, etc.

In general, water-based products are more benign than solvent-based products. If solvent-based products must be used, minimize exposure with plenty of ventilation.

9. Test samples of materials before generally exposing sensitive occupants.

If anyone living in the house has allergies, asthma, or chemical sensitivities, consult a physician with experience in these areas, and test interior building materials for tolerance. This includes paints, wall coverings, flooring, and cabinetry. For example, with paint, allow a painted sample to air out until it seems odor free; then place it next to the person's bed. A good night's sleep often indicates tolerance.

Using Healthy Building Materials

© 2007, Linda Mason Hunter

When specifying healthy building materials, use the following as a guide. For more information, check out HHI's Web site: www.healthyhouseinstitute.com.

Remember to read product labels, ask questions of the manufacturer, and study material safety data sheets (MSDS) to find out exactly what is in a product before you buy it. Don't assume the government is protecting you from harmful products. At times, government can barely keep up with labeling. It's up to you to be an informed consumer.

Caulks And Adhesives

Caulks and adhesives may seem like a small part of a building project, but they can make a big impact on air quality. Solvent-based adhesives have high levels of volatile organic compounds (VOCs), making them harmful to work and live with. Epoxy adhesives are noxious during application but relatively non-toxic when fully cured. White glue (polyvinyl acetate) and carpenter's glue (yellow aliphatic resin) are safe when dry.

Healthy adhesives are solvent-free or water-based. Caulks with a VOC content of 30-grams-per-liter or less is acceptable.

Cabinets, Doors, Molding, Shelving, Trim

These days conventional cabinets, doors, molding, shelving, and trim are often composite wood covered with veneer to make them look like wood. These products contain large amounts of formaldehyde. In a healthy home, cabinetry, doors, and built-ins are made of solid wood, formaldehyde-free wheat board (a rapidly renewable resource), and finished with a low-VOC paint or stain. Formaldehyde-free exterior-grade plywood is an acceptable material choice, or you can use alternative materials, such as stainless steel or metal with a baked-on finish, for cabinets.

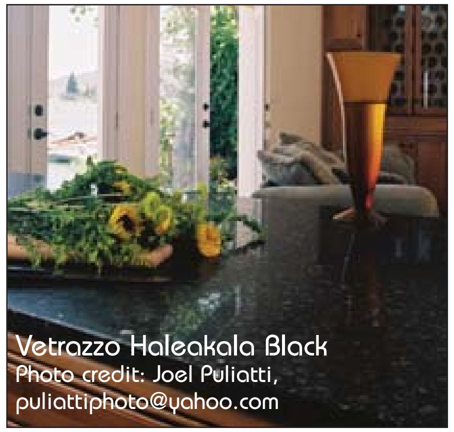
Subfloors, Sheathing, Underlayment

Subfloors, wall sheathing, countertop underlayments, and some types of wall coverings, use plywood or other composite wood products containing urea-formaldehyde binders that can off-gas for years. When using sheet goods, choose low-emission boards such as wheatboard, strawboard, isoboard, Fiber Tech™, Homasote™ (made from wheat, straw, sugarcane, or recycled paper bonded with non-toxic agents), or exterior-grade plywood. Seal it with a low-VOC vapor barrier sealant and finish with low-VOC paint.

Though plywood is not a healthy choice, exterior grade is preferable over interior grade. The phenol formaldehyde binders of exterior grade are waterproof and more stable than the urea formaldehyde binders of interior grade, which are only water resistant. It is best to seal exposed surfaces with a vapor-retardant sealer.

Countertops

In a healthy house, countertop finish material is installed over formaldehyde-free underlayment and fastened mechanically, when possible, to avoid the issue of adhesives. Avoid high-pressure plastic laminates. They contain PVCs and are often attached using high-VOC adhesives.



Vetrazzo Haleakala Black
Photo credit: Joel Puliatti, puliattiphoto@yahoo.com

Though more expensive, materials like marble, granite, concrete, ceramic tile, and stone are healthy choices. Solid-surface synthetics don't off-gas, but they are manufactured from petroleum, so they are not optimally "green."

Butcher block makes an attractive kitchen countertop, does not require underlayment, and can be mechanically fastened to cabinets. The porous surface, however, can encourage mold and bacteria growth. Be sure seams aren't glued with formaldehyde-based adhesives. Finish with odorless non-toxic oil, such as walnut oil.

Stainless steel and copper are excellent choices but present issues with creating electromagnetic fields if these are a concern to you.

New eco-products are available. Vetrazzo® (made of recycled glass from curbside-recycling programs) is touted as a sustainable alternative to granite,

IceStone Sage Pearl

quartz, and other quarried stone. IceStone® (composed of recycled glass and concrete) is another option. Both come in an array of colors, are strong like granite, yet not as porous as marble.

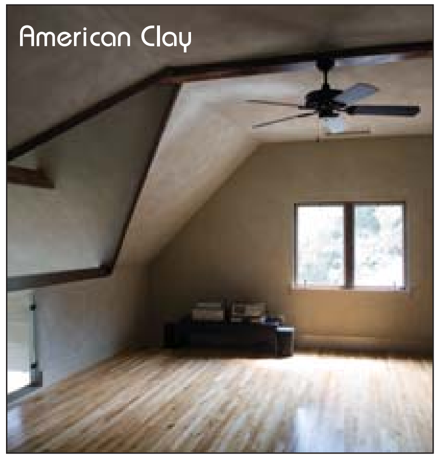
Drywall

Though economical and convenient, gypsum-based drywall (also known as Sheetrock®) is often not a healthy material for two reasons: (1) adhesives and

joint compounds off-gas irritating fumes (including formaldehyde), and (2) drywall is subject to moisture damage and mold. Chemically sensitive people often react to the off-gassing of inks used in the recycled newsprint comprising the paper facing. A less toxic solution is drywall primed with specialty paint or primer to seal off toxic fumes, and joined with non-toxic joint and texture compound, such as Murco M-100 Ni-Po, made with inert fillers and without formaldehyde and preservatives.

A new type of paperless drywall by Georgia-Pacific (DensArmor Plus®) is a highly mold-resistant gypsum panel, ideal for basements and bathrooms. The glass-matte surface front and back make it a healthy replacement for paper-faced wallboard.

The most natural wall finish (short of adobe) is additive-free plaster. Plaster has the added advantage of blocking VOC off-gassing present in the gypsum and taped joints of modern construction.


American Clay

As an added bonus, colored plaster never needs painting. Traditional plaster and lath construction is many times more expensive than drywall—if you can find someone to do it. Fortunately, veneer plaster systems (often called skim plaster) are available that provide many of the same benefits of traditional plaster for a price similar to standard drywall. Veneer plaster is simply a layer or two of plaster installed over special drywall for a smooth, seamless, and impermeable finish.

Flooring

Because it covers such a large surface, non-toxic floor coverings are essential in a healthy home. There are more choices than ever before, so it's essential to do your homework.

No matter what type of flooring you choose, if it would ordinarily be finished on-site, consider a factory-finished product instead of one you finish yourself. The factory finish allows it to cure outside the home, thus lowering in-home emissions. If you choose to finish it on-site, select a low- or no-VOC water-based

Georgia Pacific DensArmor Plus®
Paperless Drywall

adhesive.

Healthy flooring choices include ceramic tile, slate, terrazzo, brick, hardwood, pine, natural rubber, "true" linoleum, and colored concrete. Instead of wall-to-wall carpet, cover these floors with easy-to-clean natural fiber area rugs.

Avoid vinyl flooring, with the possible exception of some of the newer lower-VOC vinyl floors. Vinyl chloride fumes are a known carcinogen. Vinyl also traps moisture, which can promote delamination of subfloors and mold growth or rot, especially in hot, humid climates. In older houses, be careful removing vinyl flooring; it may be a source of asbestos.

Instead of vinyl, consider "true" linoleum (made from wood and cork "flour," limestone dust, pine resin, and colorants mixed with linseed oil from flax seeds and baked onto a jute backing). It's durable, resilient, thermally insulating, quiet, and low maintenance with natural antibacterial properties. Available in sheets or tiles, it doesn't easily show scratches or cuts and comes with a 30- to 40-year lifespan. One type,

Marmoleum

Marmoleum®, looks and feels like old-fashioned linoleum, is cushy underfoot, available in a variety of colors, and can be cut and inlaid to create one-of-kind patterns.

Similar to linoleum is natural rubber. It's durable, resilient, and easy to clean. Newer types of rubber flooring come in either rolls or tiles and cost $3 to $5 per square foot installed. Be leery of manufactured rubber flooring, though. Some are made of recycled tires, which can out-gas for a long time.

If you choose a hardwood floor, pay attention to the type of wood. The environmental choice is Forest Stewardship Council-certified wood (FSC). Be sure the underlayment doesn't contain formaldehyde. An installation that requires no glue (as in most traditional hardwood floors) is best, but if the floor must be glued use water-based glues. Finish the floor with a low- or no-VOC finish. Or, you may find a great deal on recycled wood in salvage yards and neighborhood teardowns, thus reducing the $3 to $8 per-square-foot cost of installing a conventional hardwood floor.

As a substitute for hardwood, check out renewable products such as cork and bamboo. Bamboo resists warping better than other types of wood floors and is surprisingly firm. Be careful, though. Most bamboo flooring is manufactured in China and may have adhesives and finishes that contain formaldehyde. Do your homework, and select formaldehyde-free bamboo. Cork has natural give, thus cushioning the foot, is durable, sustainable, provides acoustic and thermal insulation, and has antimicrobial benefits. When using cork, make sure it is not encased in vinyl. The price of installed cork is at the upper end of the range for wood flooring, and bamboo will cost $1 to $2 more than cork per square foot.

Beware of laminated flooring. The backing may be composite wood. Some are bonded with PVCs, which are harmful throughout their life cycle. Look for laminated floors using natural materials and biodegradable resins.

Insulation

When it comes to insulation, there's a mind-boggling array of choices, so you need to be informed.

If anyone in the house is chemically sensitive, stay clear of batt insulation backed with asphaltic coatings. Batts are not the most effective insulation, anyway. Blown-in loose-fill insulation is the better option because it doesn't settle as much as spray-in insulation does.

If you want batt-type insulation, try a new product made of recycled blue jeans. UltraTouch Natural Fiber Insulation® by Bonded Logic is safe to handle and install, contains no formaldehyde binders, and provides better acoustics than fiberglass.

Though fiberglass is the most popular insulation, many home ecologists discourage blown-in fiberglass insulation unless it is formaldehyde-free (such as Climate Pro® or Attic Protector® by Johns Manville Corporation, and Insulsafe 4® from CertainTeed Corporation).

Cellulose insulation has high energy and acoustic performance and isn't harmful to the installer, but chemicals in the ink of shredded newsprint make cellulose bothersome to some chemically sensitive people. If using dry or damp sprayed cellulose:

- Choose a product made of recycled cardboard; second best is newspaper.
- Fire retardant should be boron, not ammonia-based.
- Damp-applied cellulose must be allowed to fully dry to under 25 percent moisture content.

In general, avoid polyurethane-based expanding foams for indoor air quality issues. Cementious expanding and plant-based expanding foams (such as Air Krete® and BioBase 501®) are healthy options, but must be installed by an experienced local installer per manufacturer's instructions.

Similarly, avoid spray polyurethane foam (SPF), which can out-gas if not sealed by drywall or plaster, and some chemically sensitive people may react to it. Rigid foam insulation, popular in the 1980s, outgases badly and should not be used on interior applications.

Other non-toxic, high R-value solutions include cork and wool. (Check out wool batts by Good Shepherd Wool Insulation and Latitude Wool Insulation.)

Paints, Sealants, Stains

More than 10,000 synthetic chemicals are used in conventional paints, sealers, and stains; many are toxic solvents, mildewcides, and fungicides. Such chemical-overburdening is unnecessary. You can now find low- and no-VOC paints, stains, thinners, and waxes made from healthier raw materials. Choose water-based materials with a low VOC content of 150 grams per liter or less. Ventilate well during and immediately after painting or sealing. UHD

The Author

Linda Mason Hunter, Senior Editor of the Healthy House Institute, is a nationally recognized expert in the fields of green living and home ecology. Her first book, *The Healthy Home: An Attic-To-Basement Guide To Toxin-Free Living* (published in 1989) remains a classic in its field. She's since written two more books about home ecology—*Green Clean* (with Mikki Halpin, 2005) and *Creating A Safe & Healthy Home* (2005). She can be reached at www.hunterink.com.

Design Features Of An Ultimate Home

Figure 3

Figure 1

Figure 5

Figure 6

Figure 2

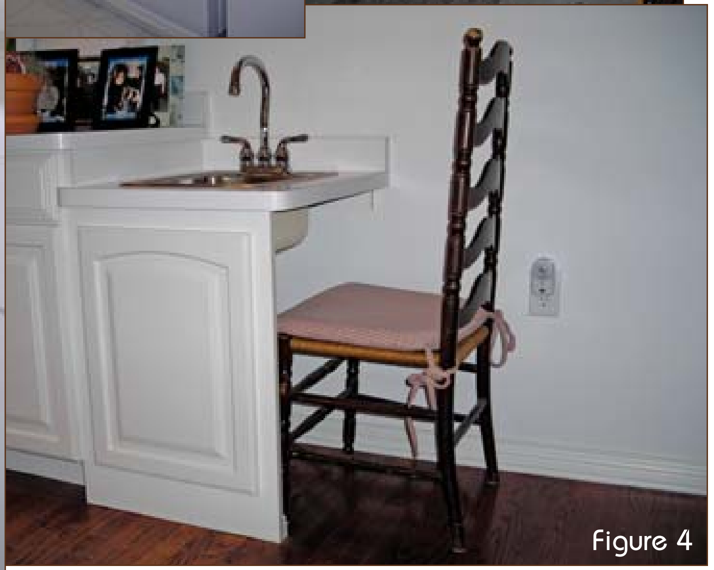


Figure 4

Wolfgang F.E. Preiser

Preparing for their golden years, Janet and Edmund Greenwald identified long-term requirements and fully detailed the design features of their future universally designed home. In 1999, after working with Stawicki & Associates, Architects of Loveland, Ohio, they moved into their new home in Glendale, Ohio, in 2000.

Small Things Really Matter

When you enter the house through the front door, there is no threshold, allowing easy access to a person using a walker or wheelchair (see Figure 1). The surface in front of the entry door gently slopes away from it so that water doesn't enter the house. Similarly, the garage floor is level with the first floor and the terrace outside the living room and kitchen area main entrance (see Figure 2).

While the terrace/patio is made out of lightly textured concrete, it is basically quite smooth to travel on, thus reducing the effort a wheelchair user has to make. Under no circumstances should pavers be used, i.e., the kind that we see at supemarkets like Wal-Mart® or Kroger super center entrances. They make for a very rough ride!

Once you have entered the home, the kitchen and hallway floors are hardwood, thus facilitating an easy ride with a wheelchair or walker. Hallways are 50 inches wide throughout the home. The living, dining room, and bedrooms are commercial-grade carpet.

All door clearances are at least 36 inches. Most importantly, all doors leading into bathroom areas are sliding pocket doors. They have the advantage that if a person has passed out in the bathroom area, it would be easy to move the door into the pocket and to assist the person behind the door. This is a very important safety feature that is often overlooked. In addition, when the sliding pocket door is open, it is out of the way and allows easy entrance for a wheelchair. Sliding pocket doors provide for full usage of the room—to place furniture and not have to worry about the door swinging open and closed. "You have so many more square feet to work with per room, with pocket doors," says Ed.

Located adjacent to the entry door from the garage is a bench, which allows one to drop off groceries or to sit down and put shoes on (see Figure 3). Then, throughout the home there are more benches, under the big living room windows, for example, which double up as storage areas. Or in the laundry room, there is a chair with rollers, which allows for a handicapped person to easily roll back and forth while putting laundry into the washer, take it out, and put it into the dryer in a front-loading mode. The laundry room is also equipped with a full bathroom, desk, phone, and television—so that time spent doing laundry can be more productive.

Kitchen

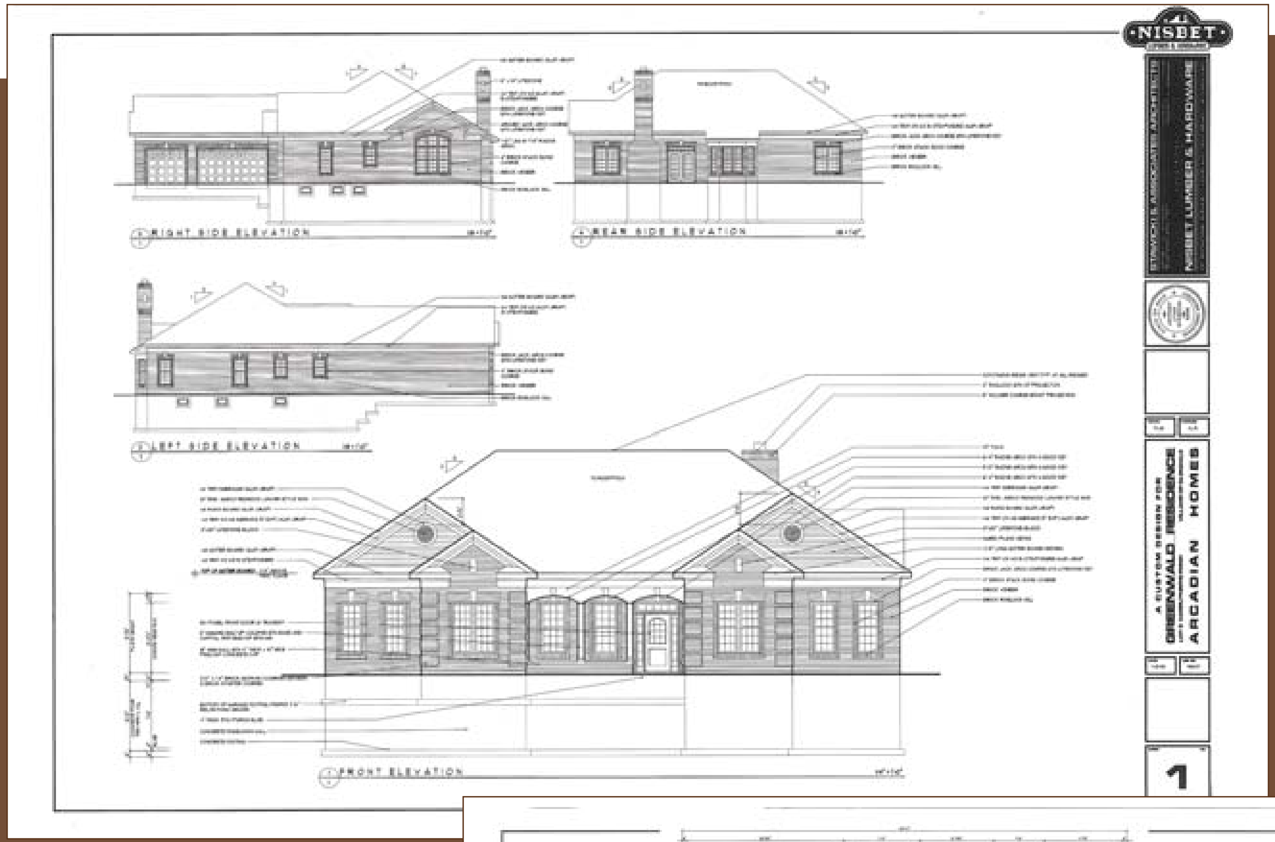
There are three ovens stacked on top of each other—one large and one small electric oven at the bottom, and the microwave oven at the top. This provides great convenience to the user by not having to move from one area to another while preparing food.

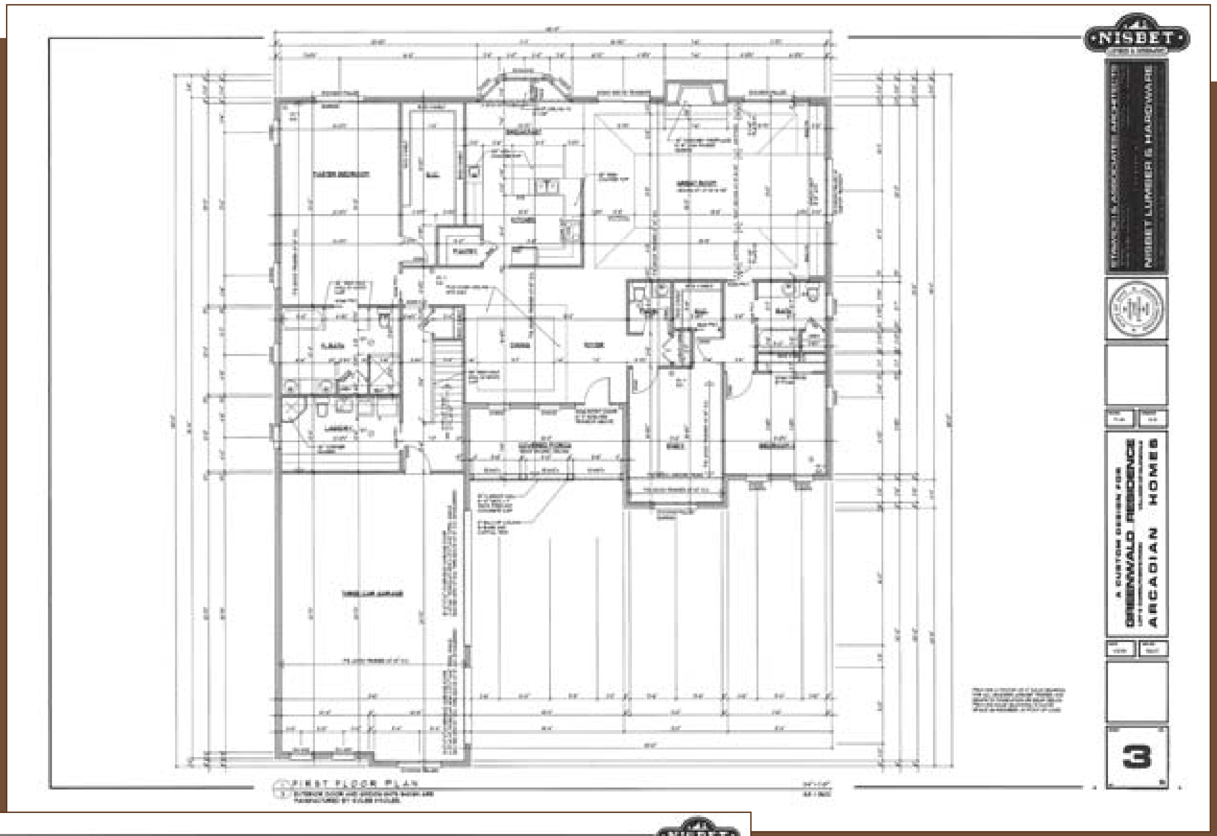
A low sink is located at the end of the counter for food preparation, such as making salads and peeling potatoes. There is no counter end panel, hence a person sitting on a chair or in a wheelchair can comfortably work at the sink. It also means that more than one person can be working in the kitchen—for family meal preparation.

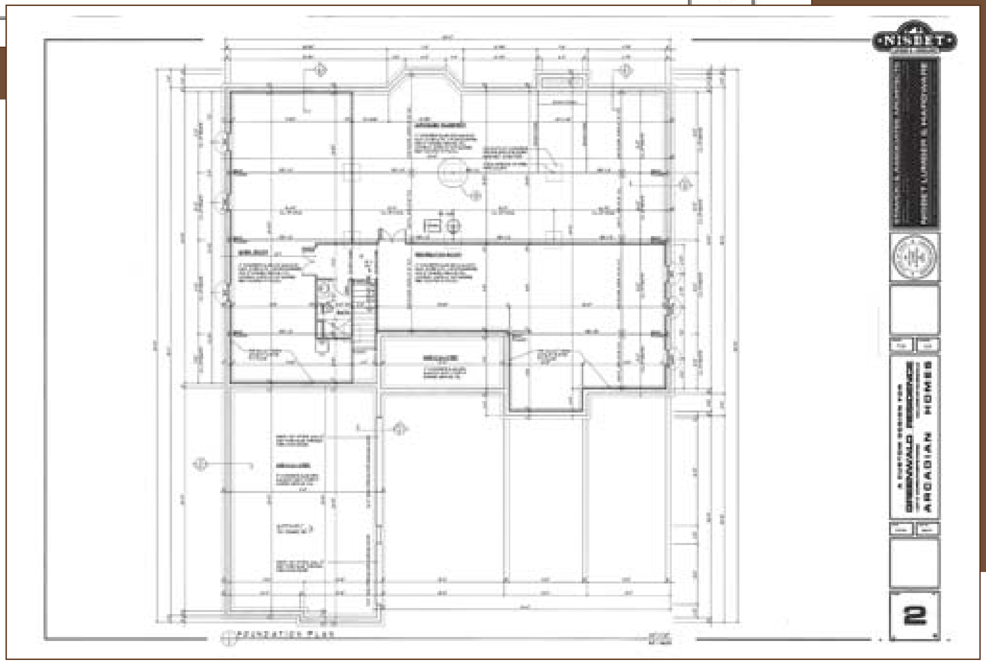
There is also a handy serving/dining ledge in the kitchen that could be used for buffet-style dining, appetizers for a party, or while enjoying a meal. "It's great for entertaining," says Janet (see Figure 4).

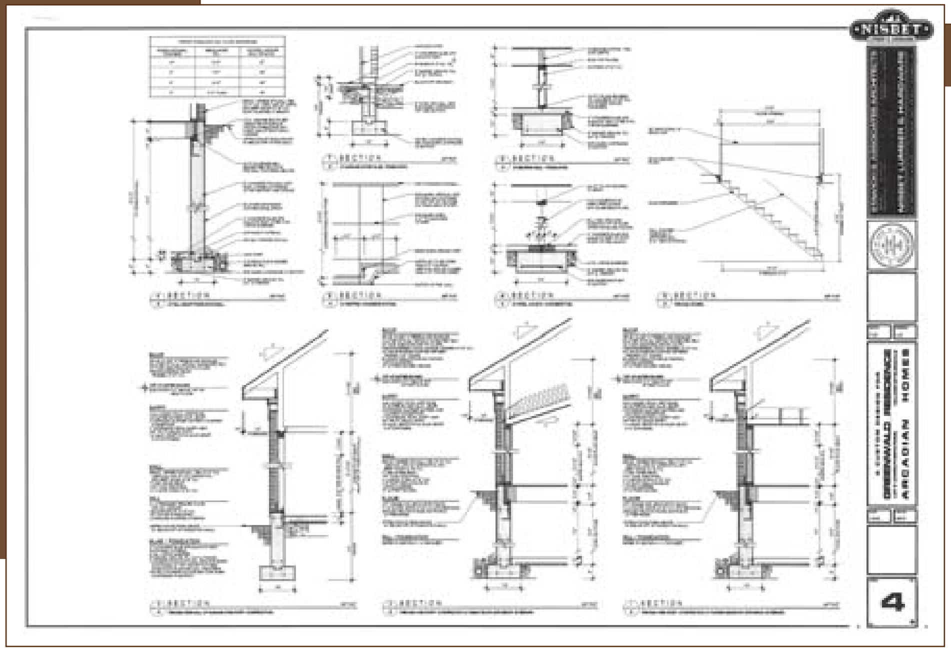
A very practical feature in the pantry is the light, which comes on automatically as one opens the pantry door. This is very convenient for someone with vision problems and limited mobility.

DESIGN universal









Dining Room

Instead of plugging night-lights into the walls, recessed lighting, similar to the tube lighting used for Christmas decorations, is hidden behind a crown molding in the dining area ceiling, thus giving adequate illumination during the nighttime, and ambiance while dining.

Electrical outlets are 18 inches above the floor, and there are many of them. There are also a few electrical outlets installed in the floor of the great room. This keeps cords out of the way and is less of a hazard. “We wanted to have options to rearrange the room, and having lots of outlets allows that flexibility,” says Janet.

Color

Colors in the home are basically kept very light, in order to be able to differentiate appliances and bathroom fixtures, which include grab bars in the bathtub and step-in shower. There is a built-in tiled seat (17 inches off of the floor and 14 inches wide) in the master shower so that you can sit down while bathing. A showerhead coupled with a hose attachment allows one to rinse off while seated. This is an important safety feature, so that hopefully one won't fall down while showering!

Hardware

All door handles are of the lever type, as they are easier to manipulate than the knob type.

Toilet Seat Height

Toilet seats are about two inches higher than the standard toilet fixture, thus facilitating easier transfer from a wheelchair to the toilet seat (see Figure 5).

The master bath has two sinks—which are set in a traditional vanity design. However, one sink is open underneath so that one can sit on a chair and groom. The master bathroom is quite sizable—large enough to accommodate a wheelchair anywhere in the room, including turning around.

Washer

In order to prevent flooding of the laundry floor in case washer hoses break, the washer is sitting in a pan with a drainage tube (see Figure 6).

Summary

The Greenwalds truly love their custom-built home. As they grow older, they appreciate the design features more each year. Their two grown daughters, Sandy and Cindy, also love the house—and the accessibility that it allows. “With everything our parents need on one floor, it is certainly easy-living,” says Sandy, Janet and Ed’s daughter. UHD

The Author
Wolfgang Preiser is Professor Emeritus of the School of Architecture and Interior Design at the University of Cincinnati, and Editor for Universal Design of *Ultimate Home Design.*

It's Time For The Home Building Industry To Take Universal Design *Seriously*

Heather Sturgill

Recently, universal design has become a tag line mentioned by media loosely associated with stories of aging "baby boomers'" effects on Social Security and U.S. industries. Unfortunately, many have no clue what it really means, or that it has been a concept for decades.

The term, universal design, was first coined by the architect Ron Mace and has been around since the 1980s. Universal design has been a topic for activists and academics ever since. The results of all this studious work—many "concept" houses and facilities associated with institutions of higher learning and centers that educate the general public on issues of, and services for, people with disabilities; but almost no penetration into the actual market.

But even with increased media attention on the topic, universal design has still not become the accepted norm in the development and renovation of housing. Universal design needs to be liberated from the realms of the activist and academic.

Over the past 30 years, academics have repeatedly concluded that universally designed housing is a great idea, but universal design is still not the accepted practice in housing construction or remodeling. Two questions logically follow:

1. Who is involved in the process from inspiration to habitation?
2. Why have they not pursued this?

The first question is fairly easy to answer by just following the process from dream to dwelling. The list of stakeholders begins with architects and interior designers that draw the housing plans. They take universal design from dream to paper. Developers, builders, and remodelers take universal design from paper to "product." They are the providers and manufacturers of the universal design "product." But they don't operate in a vacuum. Developers need money to pay builders/remodelers and have to conform to codes. This then brings in banking, and various levels of government. Lastly, there is marketing the product to the consumer and the ability of the consumer to afford the dwelling, whether through rent or mortgage. These aspects bring realtors, media, and banking and federal institutions like Fannie Mae, Freddy Mac, and HUD into the group.

Unless individuals from the above-listed groups are asked, any answer to the second question is only speculation and hypothesis. The most probable answer, though, is fear and its accompanying foundation—a lack of knowledge. Most of those listed above are not impacted by ideals and wordy concepts like:

The Seven Principles Of Universal Design

• Equitable Use: The design does not disadvantage or stigmatize any group of users.

• Flexibility in Use: The design accommodates a wide range of individual preferences and abilities.

• Simple and Intuitive: Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

• Perceptible Information: The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

• Tolerance for Error: The design minimizes hazards and the adverse consequences of accidental or unintended actions.

• Low Physical Effort: The design can be used efficiently and comfortably and with a minimum of fatigue.

• Size and Space for Approach and Use: Appropriate size and space is provided for approach, reach, manipulation, and use, regardless of user's body size, posture, or mobility. (http://www.rollingrains.com/archives/001011.html)

Most of the stakeholders mentioned want solid facts, figures, and numbers. Whether those numbers are measures of distance or dollars, they want a way of measuring and/or validating their choice to pursue universal design. Stated another way, they need to be educated as to the advantages and possibilities of universal design that would dispel the myths and stigma attached to universal design, accessible design, and inclusive design. Regrettably, this appears to verge on a "horse and cart" scenario. How do you present them with the numbers supporting universal design as "best practice"/profitable without universal design actually in the market?

More statistical scenario projections, by more academics, probably aren't going to work, though. But actual dialogue among everyone involved just might. The advocates and government agencies might come away with a better understanding of what developers need to pursue universal design and maybe even some practical, easily implemented policies that could be adopted. The academics might then be in a better place to get their knowledge into practice. The developers might end up positioned better to supply a changing market demographic. And financial institutions might be more inclined to reinvest in developer's projects if they feel it is better grounded in upcoming market need.

Though the general tone of this article may lead one to believe that no dialogue between the stakeholders is happening, there are public/private partnerships where institutions do discuss and promote universal design. Advocacy groups have gotten together with government housing providers as illustrated by changes in how the Milwaukee's Housing Authority implements housing development. Another example is the University of Cincinnati's partnership with Habitat for Humanity, where the university has educated the local Habitat organization on the benefits of universal design for everyone.

If the ultimate goal is making universal design the standard accepted practice in the development and remodeling of homes, then a larger/broader dialogue needs to occur. The stakeholders listed above need to be brought together with academics and advocates in the field to engage in discussions and an exchange of information (frequently). The general outcome of such meetings would be the expansion of accurate information about universal design into industries and arenas outside of the academic and advocacy areas that would ultimately benefit everyone from industries to the individual. UHD

synopsis

✎ Over the past 30 years, academics have repeatedly concluded that universally designed housing is a great idea, but universal design is still not the accepted practice in housing construction or remodeling.

✎ Developers and builders need to be educated as to the advantages and possibilities of universal design that would dispel the myths and stigma attached to universal design, accessible design, and inclusive design.

1st place winners Zach Fein, architecture, and Julie Fowler, interior design.

2nd place winner, Megan Pain

The Author

Heather Sturgill is attending the University of Cincinnati's Master of Community Planning program within the nationally known College of Design, Architecture, Art, and Planning on a University Graduate Scholarship. She also works on a consulting basis as the university's Environmental Accessibility Coordinator.

As the university's Environmental Accessibility Coordinator she reviews plans associated with remodeling, new development and landscape architecture in an attempt to provide functional accessibility for staff, faculty and students. This position was created to help the physical environment of the campus match the stated philosophical environment of inclusion for all members of the campus community.

House Rich, Cash Poor?

Gary Reber

Homeowners No Longer Want To Be Just "House Rich, Cash Poor"

In many communities, particularly in California, the appreciation of housing costs has grown in the last few decades. So for older homeowners, almost all of their wealth is tied to the values of their homes, while they have few other investments. Since their wealth is locked up in their homes, many cannot afford their increasing expenses and home maintenance. Some homeowners choose to sell their homes and move to a more affordable home in a different community. But many older homeowners want to "age-in-place." Increasingly, homeowners are considering reverse mortgages to cash in on the value of their homes.

The Home Equity Conversion Mortgage (HECM) is a Federal Housing Administration (FHA)-issued reverse mortgage that can be used by senior homeowners 62 years and older to convert the equity in their home into monthly streams of income and/or a line of credit to be repaid when they no longer occupy the home. The loan, commonly known as HECM, is funded by a lending institution such as a mortgage lender, bank, credit union, or savings and loan association.

While some seniors have relied on reverse mortgages to help pay for basic living expenses, others are using them to supplement their fixed incomes. A reverse mortgage is a special type of home loan that lets a homeowner convert all or a portion of the equity in his or her home into cash. Instead of the homeowner making monthly payments to the lender, the lender pays the homeowner in a lump sum or set amount each month. But unlike a traditional home equity loan or second mortgage, no repayment is required until the borrower(s) no longer uses the home as his or her primary residence or the remaining borrower dies.

Many seniors are taking advantage of reverse mortgages to help them pay their day-to-day living expenses, while others are not so frugal, using the money to upgrade their lifestyles with summer homes, vacations, and new sports cars. Many like the sense of freedom and peace of mind knowing that they have additional money each month to supplement their fixed incomes.

synopsis

- *The Home Equity Conversion Mortgage (HECM) is a reverse mortgage that can be used by senior homeowners to convert the equity in their homes into monthly streams of income.*
- *Unlike a traditional home equity loan or second mortgage, no repayment is required until the borrower(s) no longer uses the home as his or her primary residence or the remaining homeowner dies.*
- *One of the drawbacks is the high set-up costs for the loans.*

Borrower Requirements

- 62 years of age or older.
- Own your property.
- Occupy your property as primary residence.
- Participation in a consumer information session given by an approved HECM counselor.

Mortgage Amount Basis

- Age of the youngest borrower.
- Current interest rate.
- Lesser of appraised value or the FHA insurance limit.

Financial Requirements

- No income or credit qualifications are required of the borrower.
- No repayment as long as the property is the primary residence.
- Closing costs may be financed in the mortgage.

Property Requirements

- One family home or one- to four-unit home with one unit occupied by the borrower.
- Condominiums or Planned Unit Developments (PUD) must be HUD-FHA approved.
- Mobile homes that meet the U.S. Department of Housing and Urban Development (HUD) guidelines.
- Meets minimum property standards (borrower may fund repairs in the mortgage).

Homeowners 62 and older who have paid off their mortgages or have only small mortgage balances remaining, and are currently living in the home, are eligible to participate in the HECM reverse mortgage program. Homeowners can select from five payment plans:

- Tenure—equal monthly payments as long as at least one borrower lives and continues to occupy the property as a primary residence.
- Term—equal monthly payments for a fixed period of months selected.
- Line of Credit—unscheduled payments or installments, at times and in amounts of borrower's choosing until the line of credit is exhausted.
- Modified Tenure—combination of line of credit with monthly payments for as long as the borrower remains in the home.
- Modified Term—combination of line of credit with monthly payments for a fixed period of months selected by the borrower.

Homeowners whose circumstances change can restructure their payment options for a nominal fee of $20.

Unlike ordinary home equity loans, a HUD reverse mortgage does not require repayment as long as the home is the borrower's primary residence. The homeowner remains the titleholder of the property and does not owe the bank any fees as long as he and/or she lives in the home. The mortgage must be paid back with interest once the homeowner sells the home or dies. Lenders recover their principal, plus interest, when the home is sold. The remaining value of the home goes to the homeowner or to his or her survivors. You can never owe more than your home's value.

If the sale proceeds are insufficient to pay the amount owed, HUD will pay the lender the amount of the shortfall. HUD's Federal Housing Administration (FHA) collects an insurance premium from all borrowers to provide this coverage.

The amount homeowners can borrow depends on their age, the current interest rate, other loan fees, and the appraised value of their home or FHA's mortgage limits for their area, whichever is less. Generally, the more valuable your home is, the older you are, and the lower the interest, the more you can borrow.

For example, based on a loan with an interest rate of approximately nine percent, and a home qualifying for $100,000, a 65-year-old could borrow up to 22 percent of the home's value; a 75-year-old could borrow up to 41 percent of the home's value; and an 85-year-old could borrow up to 58 percent of the home's value. The percentages do not include closing costs because these charges can vary.

There are no asset or income limitations on borrowers receiving HUD's reverse mortgages.

There are also no limits on the value of homes qualifying for a HUD reverse mortgage. The value of the home will be determined by an independent appraisal. However, the amount that may be borrowed is capped by the maximum FHA mortgage limit for the area, which varies from $172,632 to $312,895. For Alaska, Guam, Hawaii, and the Virgin Islands, the FHA mortgage limits may be adjusted up to 150 percent of the ceiling, depending on the area. The FHA limits usually increase each year. As a result, owners of higher-priced homes can't borrow any more than owners of homes valued at the FHA limit.

HUD's reverse mortgage program collects funds from insurance premiums charged to borrowers. Senior citizens are charged two percent of the home's value as an up-front payment plus a .5 percent annual premium, which is paid out on a monthly basis for the life of the loan. These amounts are usually paid by the lender and charged to the borrower's principal balance.

A homeowner must receive consumer education and counseling by an HUD-FHA-approved HECM counselor. You can also use the handy Reverse Mortgage Calculator (www.rmaarp.com) to help you see if you qualify.

> "Increasingly, homeowners are considering reverse mortgages to cash in on the value of their homes."

One of the main drawbacks, however, is the high set-up costs for the loans, which include an origination fee, a monthly service charge of about $30 to $35, mortgage insurance premium, appraisal fee, and other closing costs. According to Bronwyn Belling, a reverse mortgage specialist with AARP, the total costs can range anywhere from $8,000 to $12,000 for homes with market values of $200,000 to $300,000.

Reverse mortgages are offered by three main lenders: Federal Housing Administration, Fannie Mae, and Financial Freedom Senior Funding Corporation.

To find out if you are a candidate for a reverse mortgage, you can contact HUD and get free valuable information on reverse mortgages. Please visit the HUD Homes and Communities Web site at www.hud.gov/offices/hsg/sfh/ hecm/rmtopten.cfm. UHD

HOME finance

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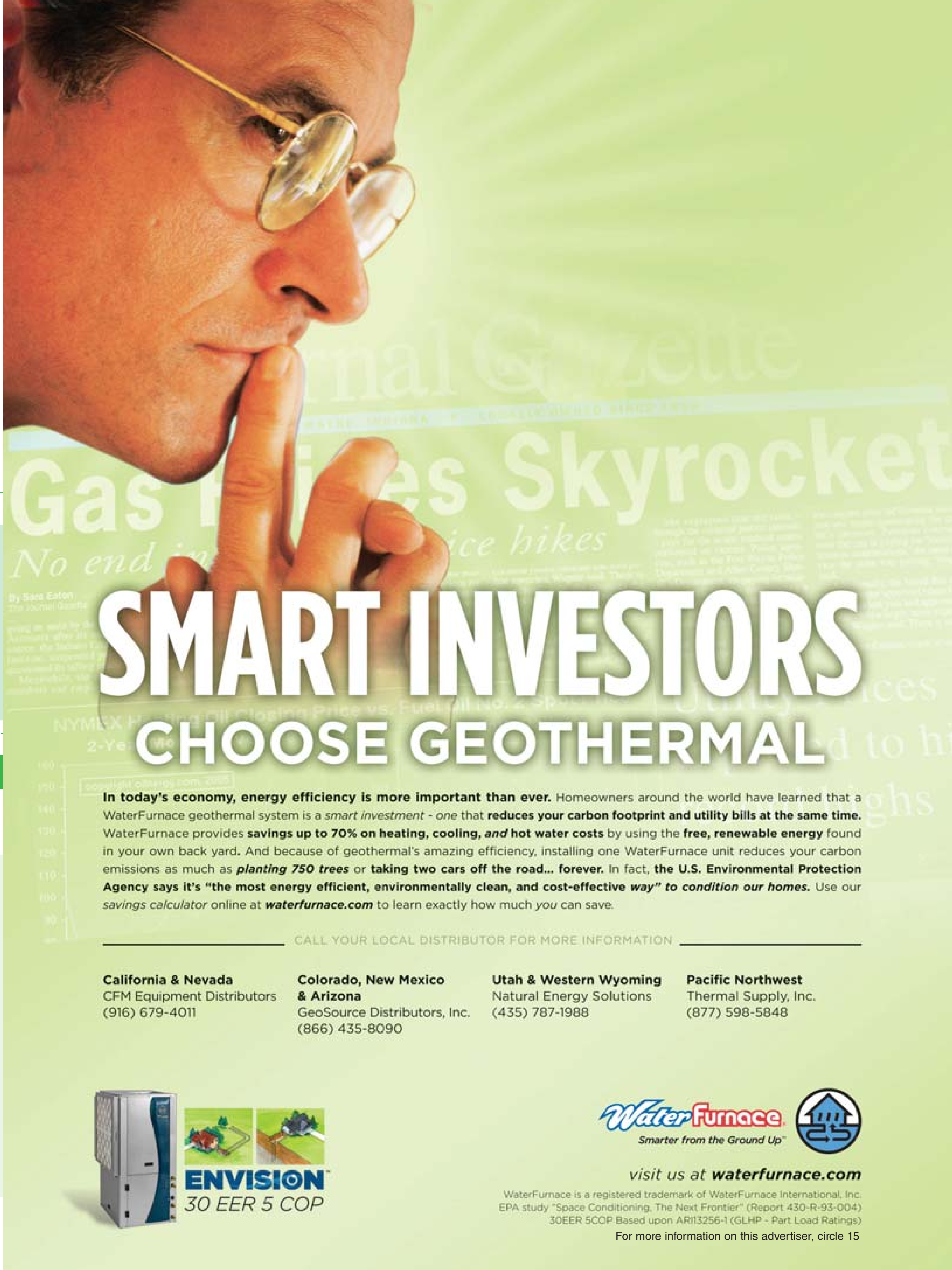
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